Vol. 30. Pts. 11–12. Pp. 141–175*. 49 figs. 29st December, 1961

THE PROCEEDINGS
OF THE
ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Series B

TAXONOMY

World List abbreviation: *Proc. R. ent. Soc. Lond.* (B)

CONTENTS

	PAGE
THORNTON, I. W. B. Comments on the geographical distribution of *Pseudocaecilius elutus* Enderlein (PSOCOPTERA), and descriptions of related new species from Hong Kong. .	141–152, 19 figs.
UVAROV, B. P. and DIRSH, V. M. The diagnostic characters, scope and geographical distribution of the subfamily ROMALEINAE (ORTHOPTERA : ACRIDIDAE) . . .	153–160, 4 figs.
CHACKO, M. J. and KATIYAR, R. N. *Hadrophanurus karnalensis* sp.n. (HYMENOPTERA : SCELIONIDAE), a parasite of *Bagrada cruciferarum* Kirkaldy (HEMIPTERA : PENTATOMIDAE)	161–163, 10 figs.
KURIAN, CHANDY and MATHEN, K. Description of a new species of *Mystrocnemis* (HYMENOPTERA : BETHYLOIDEA : SCLEROGIBBIDAE) from India	164–166, 4 figs.
ALEXANDER, CHARLES P. New or little-known species of exotic TIPULIDAE (DIPTERA).—IX	167–172, 12 figs.
INDEX	173

LONDON
PUBLISHED BY THE SOCIETY AND
SOLD AT ITS ROOMS, 41, QUEEN'S GATE, S.W.7.
Price 9s. 6d.

* With Title Page, Contents and Index

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Founded 1833. Incorporated by Royal Charter 1885

Patron:

HER MAJESTY THE QUEEN

OFFICERS AND COUNCIL FOR THE SESSION, 1961–1962

PROFESSOR G. C. VARLEY, *President*

MR. R. B. BENSON
DR. N. E. HICKIN
MR. M. J. WAY
} *Vice-Presidents*

DR. C. G. BUTLER, *Treasurer*
DR. PAUL FREEMAN, *Secretary*
MR. W. H. POTTS, *Editor*

Other Members of Council

PROFESSOR D. S. BERTRAM
DR. M. I. CRICHTON
DR. K. U. CLARKE
MR. R. G. DAVIES
DR. A. M. EASTON
DR. J. E. HARKER
DR. P. T. HASKELL
DR. B. R. LAURENCE
MR. H. OLDROYD
SIR BORIS UVAROV, K.C.M.G., F.R.S.

MISS E. EVANS, *Registrar*

Finance and House Committee

PROFESSOR D. S. BERTRAM (*Chairman*)

MR. J. P. DONCASTER
DR. J. A. FREEMAN, O.B.E.
DR. N. E. HICKIN
DR. D. J. LEWIS
MR. M. E. SOLOMON

Publication and Library Committee

MR. R. G. DAVIES (*Chairman*)

DR. J. D. CARTHY
DR. P. T. HASKELL
DR. C. G. JOHNSON
MR. D. LEATHERDALE
MR. G. E. J. NIXON

Conservation (Insect Preservation) Committee

MR. R. B. BENSON (*Chairman*)

DR. B. M. HOBBY
MR. T. G. HOWARTH
DR. A. M. MASSEE
MR. F. T. VALLINS
MR. M. J. WAY

The Executive Officers of the Society are *ex-officio* members of all Committees.

DELEGATES OF THE SOCIETY TO:

1. **British National Committee for Biology** (Royal Society).
   Dr. H. E. Hinton, F.R.S., appointed 1958.
2. **Local Committee of Management of Wicken Fen.**
   Dr. John Smart, appointed 1960.
3. **National Trust for Places of Historic Interest or Natural Beauty.**
   Mr. N. D. Riley, C.B.E., appointed 1955.
4. **New Forest Association.**
   Mr. C. W. Mackworth-Praed, appointed 1948.
5. **New Forest Joint Committee.**
   Lt.-Col. F. C. Fraser, appointed 1949.
6. **Field Studies Council.**
   Dr. W. H. Thorpe, F.R.S., appointed 1944.
7. **Yorkshire Naturalists' Trust, Ltd.**
8. **The Biological Council.**
   Dr. N. E. Hickin, appointed 1952.
9. **The Parliamentary and Scientific Committee.**
   Dr. N. E. Hickin, appointed 1953.
10. **British Co-ordinating Committee for Nature Conservation.**
    Mr. R. B. Benson, appointed 1960.
11. **Council for Nature.**
    Dr. N. E. Hickin, appointed 1958.

COMMENTS ON THE GEOGRAPHICAL DISTRIBUTION OF *PSEUDOCAECILIUS ELUTUS* ENDERLEIN (PSOCOPTERA), AND DESCRIPTIONS OF RELATED NEW SPECIES FROM HONG KONG

By Ian W. B. Thornton

(*Department of Zoology, University of Hong Kong*)

Enderlein (1903) described *Pseudocaecilius elutus* and *P. ornatus* from Singapore, but no other species of this genus have been recorded from continental Asia. In 1926, Enderlein recorded both these species from Java and described *Pseudocaecilius tenellus*, and in 1937 *P. innotatus* Banks was described from the Philippine Islands. Two species of this genus have been recorded from Japan, namely *P. maculosus* End., 1907 and *P. solocipennis* End., 1907. In this paper, a comparison is made between specimens of *P. elutus* collected in Hong Kong and those described from Africa, and three new species are described.

Pseudocaecilius elutus Enderlein, 1903

In his original description, based on Singapore specimens, Enderlein referred to pigmented areas of the fore wing on the areola postica, pterostigma, the junction of *rs* and *m*, and the cubital and anal cells. Very little information was given about the male, and there were no figures. In 1926, he recorded specimens from Java, and provided a redescription which included the fact that the pigmentation of the areola postica reaches vein *m*, and that the tips of veins r_{2+3}, r_{4+5}, m_1, m_2, m_3 have light brown borders. Again, no drawings were included.

Navas (1934) described *Trichopsocus indicatus* from India, mentioning the dorsal fuscous transverse bands on the abdomen, and the brown pigmentation on the fore wing at the anal and cubital cells, the areola postica and the apical third of the pterostigma. A figure of the fore wing shows that the pigmentation of the areola postica reaches the media, although this is not mentioned in the text. I have seen specimens of Navas's species in the Muséum d'Histoire Naturelle, Paris, and, although I was unable to dissect a specimen, it seems highly probable that it is identical with Enderlein's species.

Badonnel (1931) described a new variety, *africanus*, from a Mozambique female in which the pigmentation of the areola postica reaches the media, thoracic tergites are darker, and the markings on the vertex leave an X-shaped paler area. Two more females of this variety were later recorded from the Belgian Congo (Badonnel, 1946), with descriptions and figures of the genitalia, and descriptions of the claws, and later numerous females and nymphs were recorded (Badonnel, 1948). In 1955 further specimens were collected from Angola (Badonnel, 1955), and an additional female character was provided—a chocolate-coloured lateral stripe from the antennal socket to the posterior edge of the thorax, the females being otherwise similar to those previously collected in Africa. In the same paper the male was described as also possessing the chocolate brown lateral line and pale X-shaped area on the head, and the male genitalia were described and figured.

Since Enderlein (1926) indicated that the pigmentation of the areola postica reaches the media, as it does in var. *africanus*, the only known differences between this variety and the oriental *elutus* are in head markings, degree of pigmentation of thoracic terga, and the lateral dark stripe, and the latter is apparently not a constant feature of African specimens.

Thirteen females of *P. elutus* have been collected in Hong Kong, and all possess both the dark lateral stripe and the pale X on the head. Wing markings, genitalia and abdominal terminalia all agree with Badonnel's descriptions of var. *africanus*. The dimensions of the African specimens are generally greater than those from Hong Kong (Table I), in most cases falling outside limits within which 95 per cent. of the Hong Kong population may be expected to fall. Unfortunately no male has yet been found in Hong Kong.

TABLE I.—*Length (in mm.) of various characters of* Pseudocaecilius elutus *End.*

	Hong Kong specimens			African specimens (from Badonnel)		Other oriental specimens (from Enderlei and Navas)	
Character	Number of specimens	Range	Mean ± S.D.	Number of specimens	Range	Number of specimens	Range
Fore wing (*Fw*)	13	1·890–2·430	2·227±0·147	4	2·450–2·970	3	2·50–2·8
Hind wing (*Hw*)	13	1·400–1·830	1·686±0·129	.	.	1	2·00
Hind femur (*Hf*)	11	0·470–0·530	0·490±0·015	1	0·608	.	.
Hind tibia (*Ht*)	11	0·765–0·910	0·823±0·049	3	0·900–1·048	.	.
Proximal hind tarsal segment (t_1)	11	0·190–0·260	0·226±0·023	3	0·272–0·312	.	.
Second hind tarsal segment (t_2)	11	0·105–0·125	0·112±0·006	3	0·108–0·128	.	.
Antenna (*A*)	8	1·460–1·660	1·571±0·072	.	.	.	.
First flagellar segment (f_1)	10	0·310–0·405	0·356±0·024	1	0·488	.	.
Second flagellar segment (f_2)	10	0·200–0·230	0·213±0·011	1	0·336	.	.
Ratio t_1/t_2	9	1·72–2·23	2·070±0·123	3	2·31–2·60	.	.
Ratio f_1/f_2	10	1·51–1·74	1·664±0·071	1	1·45	.	.
Number of ctenidiobothria on first hind tarsal joint	11	11–16	12·6	.	.	.	.

The discovery of Hong Kong specimens whose genitalia, as well as head and thorax markings, agree with the variety *africanus* raises doubts regarding the status of this variety. It seems that *P. elutus* may be regarded as having an Afro-Oriental distribution, being recorded from Angola, Congo, Mozambique, India (?), Singapore, Hong Kong and Java. A more definite statement will be possible when the male of *P. elutus* from the Orient has been fully described.

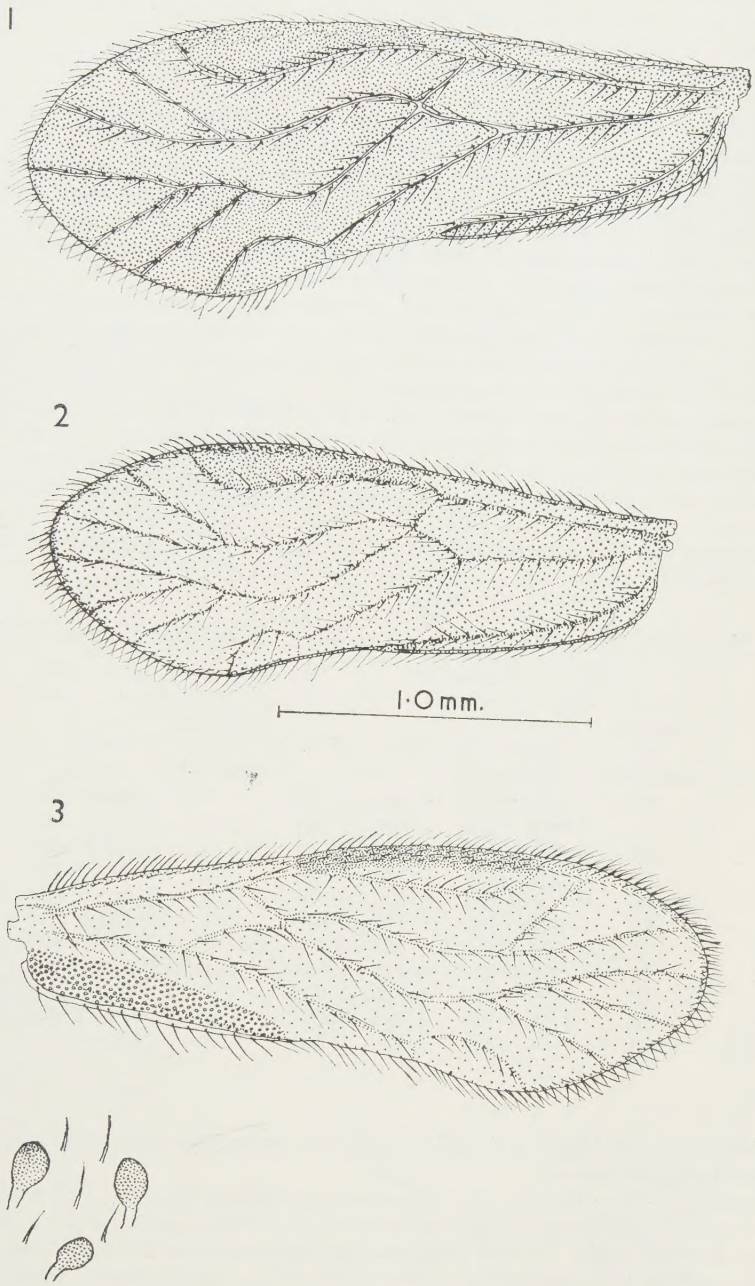
In Hong Kong, the nymphs are recognisable by the lateral dark stripe on the thorax.

The size, venation and pigmentation of the wings of *Pseudocaecilius citricola* (Ashmead, 1879) (=*pretiosus* Banks, 1920) (Mockford and Gurney, 1956), are, according to description, very close indeed to those of *P. elutus*. The female genitalia differ slightly, notably in the shape of the distal margin of the subgenital plate, but there is remarkable agreement in ciliation of the epiproct and paraprocts. Although descriptions of *P. citricola* make no mention of the X-shaped area on the head, Chapman (1930) described the dark lateral stripe running from antenna to abdomen. The two species are undoubtedly very closely related. *P. citricola* has been reported from Florida, Texas, Washington D.C. and Porto Rico (West Indies).

Pseudocaecilius maculifrons sp. n.

Female

Coloration (freshly killed, in alcohol).—Frons and vertex buff, bearing dark hairs sited on brown spots, suture between frons and vertex dark, usual pattern on vertex faint. Postclypeus cream with narrow indistinct striae somewhat more transverse than usual. Labrum and anteclypeus white. Genae buff, brown marks from eye to antennal socket, from antennal socket to



FIGS. 1–4.—Fore wing of: (1) *Pseudocaecilius maculifrons* sp. n. female; (2) *P. anomalus* sp. n., female; (3) *P. hirsutus* sp. n., male. (4) "Sense-clubs" of axillar cell of fore wing of male *P. hirsutus*, highly magnified. (Figs. 1, 2 and 3 have common scale).

posterior edge of gena, along ventral edge of gena. Antennae brown. Eyes grey, ocelli pale. Maxillary palpi brown, last segment darker apically.

Thoracic scuta brown, scutella somewhat paler, sutures brown ; pleura brown, a dark brown granulated stripe above coxae. Legs uniformly brown. Fore wings uniformly suffused brown, hairs sited on indistinct dark spots, hind wings paler.

Abdomen dorsally buff, mottled cream and grey-brown, a paler median line ; ventrally pale cream.

Morphology.—I.O. : D. (Ratio between interocular space and apparent eye-diameter as seen from front of head) = 3·7 : 1. A row of hairs along frons-vertex suture.

Fore wing venation (fig. 1). Of 15 females examined, in 10 *rs* and *m* are fused for a short distance, in 2 they meet at a point, and in 3 they are joined by a cross-vein. In hind wing, *rs* bare or with one or two hairs, r_{4+5} with at least 6 hairs, r_{2+3} bare or with one hair near its base, vein *m* setose only in distal half. Number of ctenidiobothria on proximal segment of hind tarsus : 10–13 (15 specimens, average 12). No pre-apical tooth on claw.

Subgenital plate (fig. 5) apically bilobed, each lobe roughly triangular and bearing two stout setae, one at the apex of the lobe, the other mid-way near mesial edge. In one case, the lobes are not pointed, and one lobe has a third seta between the usual two.

A field of 10 trichobothria on each paraproct.

Gonapophyses (fig. 6) : ventral valve with an inner leaf-like lobe, and an outer styliform point, which projects some distance from lobe and is beset with small spinelets. Dorsal valve similar, larger, lobe relatively larger and styliform point curved apically, only just projecting further than lobe and bearing a row of fine fairly long, mesially directed hairs ; lateral valve bearing about 9 long setae.

Dimensions.—Body length (in alcohol) : 1·8–2·2 mm. Dimensions of other characters are set out in Table II.

TABLE II.—*Length of various characters of* Pseudocaecilius maculifrons

	Female			Male		
Character	Number of specimens	Range (mm.)	Mean ± S.D. (mm.)	Number of specimens	Range (mm.)	Mean ± S.D. (mm.)
Fw . .	15	1·800–2·260	2·069±0·131	7	1·890–2·300	2·073±0·167
Hw . .	15	1·460–1·740	1·649±0·105	7	1·460–1·830	1·624±0·131
Hf . .	15	0·360–0·422	0·400±0·015	7	0·410–0·440	0·425±0·011
Ht . .	15	0·675–0·880	0·746±0·049	7	0·755–0·835	0·793±0·027
t_1 . .	14	0·180–0·240	0·196±0·014	7	0·215–0·250	0·230±0·013
t_2 . .	14	0·095–0·125	0·111±0·010	7	0·105–0·130	0·117±0·007
A . .	7	1·290–1·410	1·329±0·045	5	1·630–1·800	1·714±0·093
f_1 . .	14	0·290–0·420	0·313±0·033	6	0·345–0·415	0·383±0·027
f_2 . .	13	0·190–0·270	0·205±0·022	6	0·235–0·280	0·259±0·015
Ratio t_1/t_2 .	13	1·56–2·18	1·794±0·203	7	1·80–2·22	1·978±0·162
Ratio f_1/f_2 .	13	1·44–1·71	1·540±0·066	6	1·38–1·56	1·474±0·069

Male

Coloration (freshly killed, in alcohol).—As female, except abdomen white, with greyish brown granulated pigment laterally.

Morphology.—I.O. : D = 1·1 : 1. Antenna longer than in female.

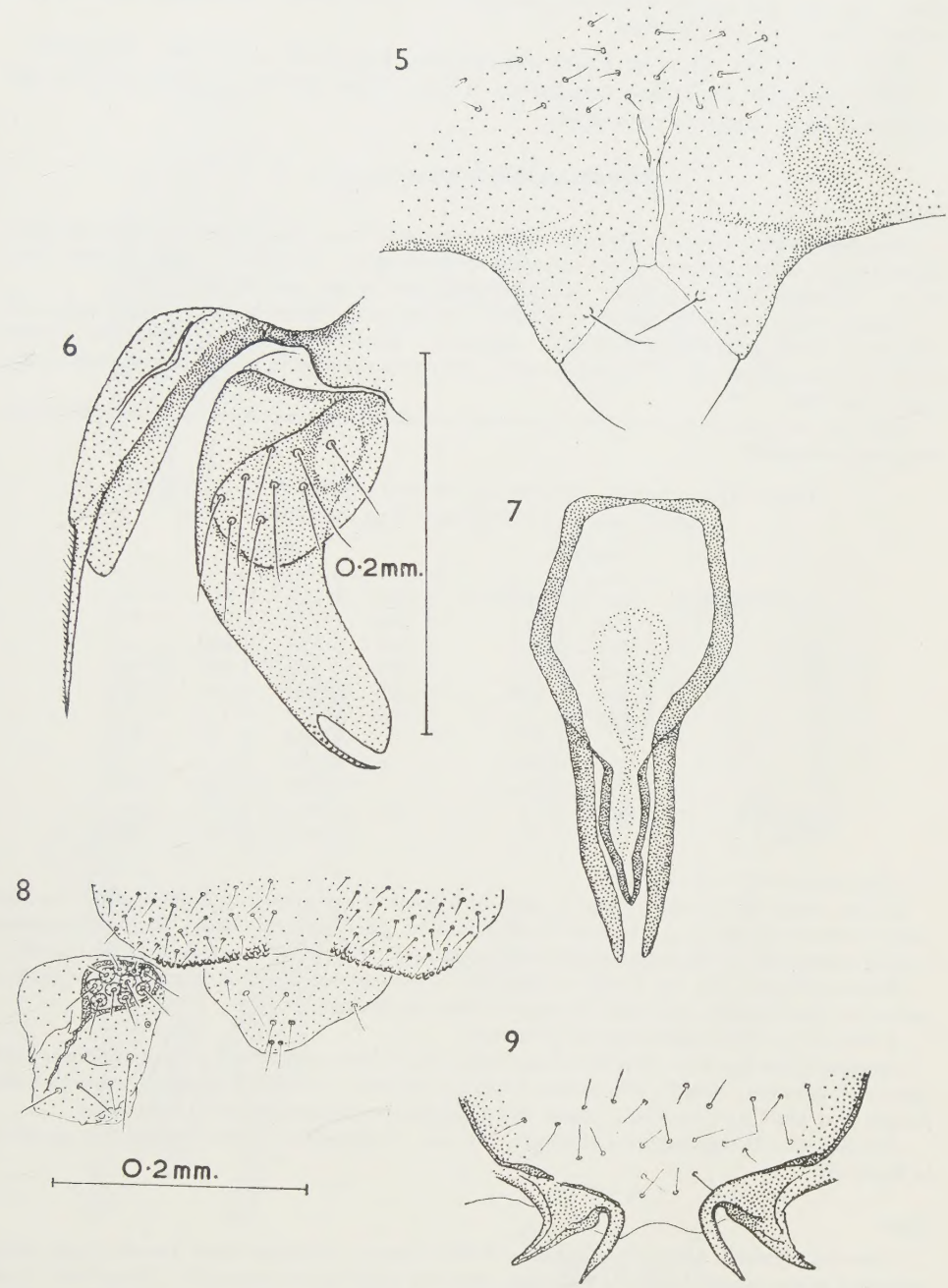
Of 7 male left fore wings, in 4 *rs* and *m* are fused, in 2 they are joined by a cross-vein and in one they meet in a point. In hind wing some hairs on *rs*, hairs on the whole length of r_{4+5}, about 18 hairs on distal three-quarters of *m*, one or two on r_{2+3} near its base. Veins otherwise bare. Number of ctenidiobothria on proximal segment of hind tarsus : 13–16 (7 specimens).

Last abdominal tergite (fig. 8) with a comb-like papillose strip on its posterior margin, except medially where it is very lightly sclerotised.

Paraprocts with a field of 10 trichobothria bordered by a well-sclerotised ridge (fig. 8).

Genitalia : phallosome (fig. 7) basally angular, with internal and external arms apically. Hypandrium (fig. 9) laterally with two stout dorsally-directed hooks or claspers.

Dimensions.—Body length (in alcohol) : 1·5–1·8 mm. Dimensions of various characters are given in Table II.



FIGS. 5–9.—*Pseudocaecilius maculifrons* : (5) subgenital plate, female ; (6) female gonapophyses ; (7) phallosome ; (8) apex of abdomen, male ; (9) hypandrium. (Figs. 5, 6 and 7 have a common scale, as have figs. 8, 9.)

Nymph

Late instar nymphs recognisable by the fact that the hairs on the vertex are sited on dark spots. Abdomen has median white band, bordered by diffuse greyish longitudinal bands with a similar diffuse band more laterally.

Hong Kong Island: on *Pinus massoniana*, viii–xii.57; i–iv.58; frequent.

Distinguishable under low magnification from other species included here by the head hairs being sited on dark spots.

Pseudocaecilius anomalus sp. n.

Female

Coloration (freshly killed, in alcohol).—Head very pale cream, markings on vertex and postclypeus faint. Dark hairs on vertex not sited on dark spots. Ocelli pale, inner borders dark brown. Antennae pale, eyes black. Maxillary palpi pale brown, last segment brown.

Thoracic terga pale buff, posterior sutures of scuta and scutella brown. Pleura pale buff with sparse brown granulations ventrally. Legs pale. Fore wing uniformly pale brown, except along cu_2 (nomenclature as in Badonnel, 1951) and short segment of areola postica, hind wing paler, veins dark.

Abdomen very pale cream with faint transverse granulated markings dorsally, broader and more conspicuous ventrally.

Table III.—*Length (in mm.) of various characters of 2 females and 4 males of* Pseudocaecilius anomalus

	Females		Males			
Fw . .	1·690	1·900	1·560	2·170	2·170	2·430
Hw . .	1·370	1·570	1·290	1·700	1·730	1·870
Hf . .	0·355	0·405	0·350	0·410	0·460	0·450
Ht . .	0·645	0·745	0·635	0·795	0·845	0·845
t_1 . .	0·205	0·205	0·205	0·240	0·225	0·235
t_2 . .	0·105	0·115	0·095	0·115	0·115	0·115
A . .	.	1·370	.	1·860	2·140	2·030
f_1 . .	.	0·290	.	0·400	0·455	0·410
f_2 . .	.	0·210	.	0·290	0·320	0·300
Ratio t_1/t_2 .	1·95	1·78	2·16	2·09	1·96	2·04
Ratio f_1/f_2 .	.	1·38	.	1·38	1·42	1·37

Morphology.—I.O. : D = 4·0 : 1.

In fore wing (fig. 2) veins *rs* and *m* meet in a point or are joined by a cross-vein. In hind wing 3–5 setae on vein r_{4+5}, 4 on distal half of vein *m*, otherwise veins bare. Proximal segment of hind tarsus with 13–14 ctenidiobothria (2 specimens). Claws with a small pre-apical tooth.

Subgenital plate (fig. 10) similar to that of *P. maculifrons*, but with a much more distinct pattern of sclerotisation, and with the apical lobes less distinct.

A field of 10 trichobothria on each paraproct.

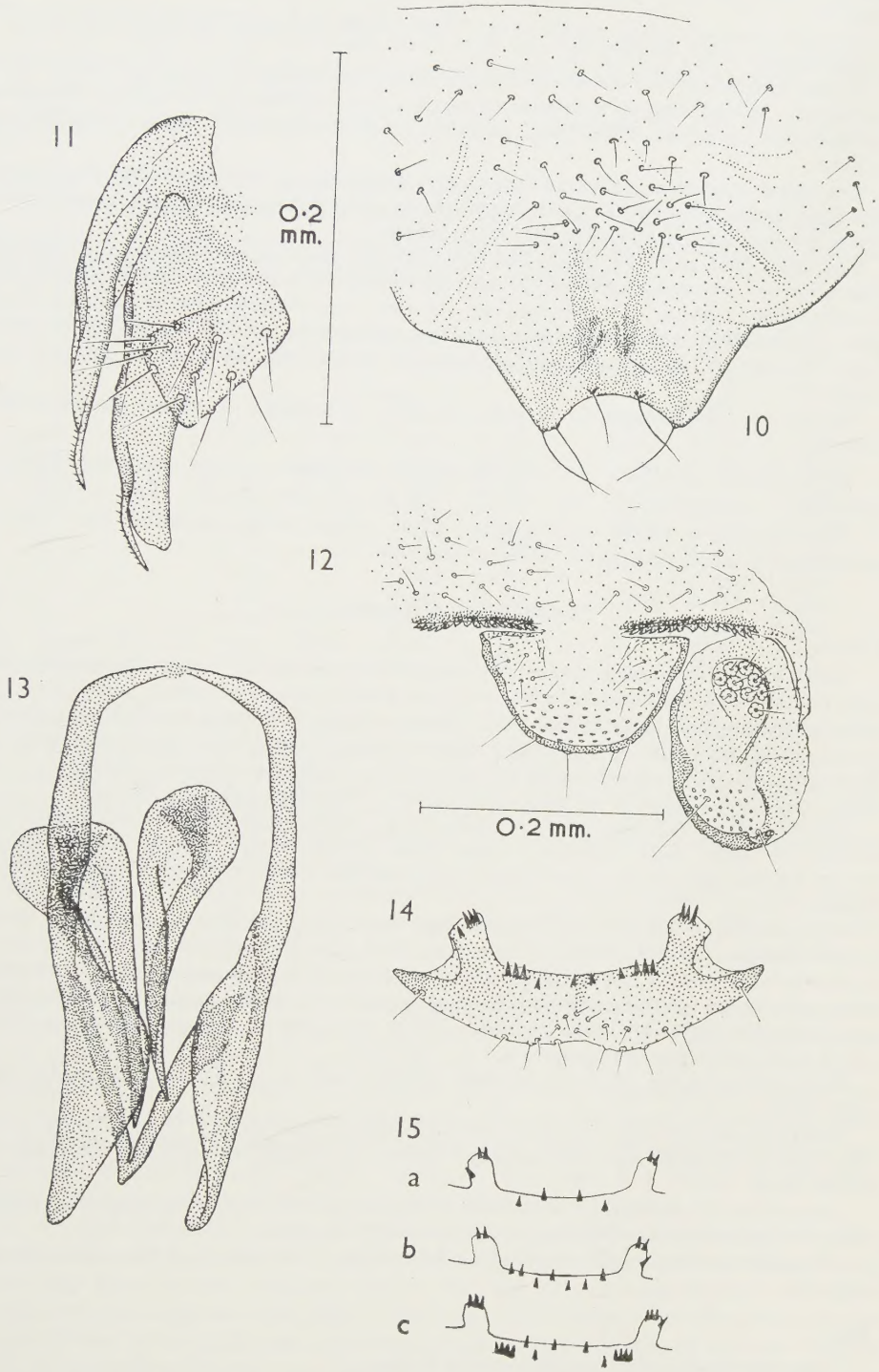
Gonapophyses (fig. 11): ventral valve apically with foliaceous lobe and a short styliform point beset with spinelets; dorsal valve similar, larger, apical point curved and projecting some distance further than the tip of the lobe; lateral valve rectangular, bearing about 11 long setae.

Dimensions.—Body length (in alcohol): 1·8 mm. Dimensions of other characters are given in Table III.

Male

Coloration (freshly killed, in alcohol).—Vertex brown, markings dark brown, hairs dark; epicranial suture almost black. Ocelli pale, bordered dark brown internally. Frons buff. Postclypeus buff posteriorly, brown anteriorly, the brown pigment sometimes extending posteriorly and narrowing to reach the anterior ocellus, leaving a buff patch on either side. Anteclypeus and labrum pale. Genae brown, dark brown along posterior margin and from antennal socket to posterior margin of orbit. Antennae with scape and pedicel buff, flagellum brown. Eyes dark purplish-brown. Maxillary palpi brown, last segment darker.

Mesothoracic tergites brown, a small white mark in centre of scutum, sutures dark. Metathorax similar, somewhat paler. Thoracic pleura brown, sutures dark. Fore wings uniformly



FIGS. 10–15.—*Pseudocaecilius anomalus*: (10) subgenital plate, female; (11) female gonapophyses; (12) apex of abdomen, male; (13) phallosome; (14) hypandrium, posterior view; (15 *a–c*) diagrams showing variability of spine arrangement on hypandrium. (Figs. 10, 11 and 13 have common scale, as have figs. 12 and 14.)

suffused with brown, hind wings paler, veins dark. Legs brown, except trochanter and femur colourless.

Abdomen very pale cream, almost white. Ninth tergite and apical structures dark brown.

Morphology.—I.O. : D = 1·8 : 1.

In fore wing *rs* and *m* fused for a short distance (2 specimens) or joined by a cross-vein (2 specimens). In hind wing, up to 11 setae on vein r_{4+5}, 4 or 5 on distal half of vein *m*. Number of ctenidiobothria on proximal hind tarsal segment : 11–15 (4 specimens). Small pre-apical tooth on claw.

Last tergite of abdomen with two serrated sclerotised strips on hind margin (fig. 12). Epiproct with outer border well sclerotised, paraprocts heavily sclerotised apically and with an apical field of very fine papillae, a basal field of 9–11 trichobothria.

Genitalia : phallosome (fig. 13) apically with broad flat outer arms well separated ; inner arms united, narrow ; a complex sclerotised radula with two pairs of long and one pair of short apically directed pointed sclerites. Hypandrium (fig. 14) with a peg-like projection on each side of posterior margin. Short conical tubercles on and just posterior to posterior margin and on projections. Number and arrangement of these tubercles variable (fig. 15*a–c*) in the few specimens examined.

Dimensions.—Body length (in alcohol) : 1·6 mm. Dimensions of various characters as in Table III.

Hong Kong Island : on *Cunninghamia lanceolata, Eurya japonica, Sterculia lanceolata* ; above 200 m. vii, viii.57 ; xii.58 ; iii.59 ; iii.60. Two ♀, 4 ♂.

This species is easily distinguished from other species included here, by the presence of a small pre-apical tooth on the claw.

Pseudocaecilius hirsutus sp. n.

Female

Coloration (freshly killed, in alcohol).—Head generally light buff. Vertex with usual markings light greyish-brown, indistinct, a brown band from anterior margin of orbit to median epicranial suture encloses an oval buff area each side. Hairs on vertex dark brown, not sited on individuial spots. Postclypeus light brown, with indistinct striae. Anteclypeus and labrum pale buff. Genae pale buff, antennal socket encircled light brown. Antennae uniformly pale brown. Eyes black, ocelli pale, internally bordered greyish-brown. Maxillary palpi pale brown.

Mesothoracic scutum light brown, scutellum buff. Bristles dark brown. Metathoracic terga similar but paler. Legs colourless except tibiae and tarsi faint brown. Fore wing uniformly suffused light brown, anterior half of pterostigma white by reflected light ; hind wing hyaline.

Abdomen pale cream with distinct transverse bands along posterior edges of terga.

Morphology.—I.O. : D = 3·2 : 1. Prominent stout hairs on head and thorax.

In fore wing veins *rs* and *m* united by a cross-vein in all 4 specimens examined. Hind wing veins bare, in one specimen a single hair on m_1 in another a single hair beside *cu*. Number of ctenidiobothria on first hind tarsal segment : 16–17 (4 specimens). Claws sharply bent, no pre-apical tooth, pulvillus membraneous.

Subgenital plate (fig. 16) : apical portion bilobed, bare, except 5–6 hairs on margin, rest of plate setose.

Gonapophyses (fig. 17) : ventral valve large, fleshy, without any terminal point ; dorsal valve similar, somewhat narrowed apically ; lateral valve small, bearing 2 very long and 2 or 3 shorter setae.

Paraprocts with an apical row of about 5 long setae, a subapical very long seta ; basally a field of 10 trichobothria, with a long seta just lateral to the field.

Dimensions.—Body length (in alcohol) : 2·6–2·8 mm. Dimensions of other characters as in Table IV.

Male

Coloration (freshly killed, in alcohol).—As female.

Morphology.—I.O. : D = 2·6 : 1. Flagellum nearly twice as thick as that of female.

In fore wing (fig. 3) *rs* and *m* joined by a cross-vein, axillar cell covered with " sense-clubs " (fig. 4). Hind wing veins bare. Claws sharply bent, no pre-apical tooth. Number of ctenidiobothria on first hind tarsal segment : 13–15 (3 specimens).

Last abdominal tergite with complex lateral sclerotised bars framing the phallosome (fig. 19). The apex of these bars bears a blunt conical papilla.

Genitalia : phallosome (fig. 18) angular basally, open apically, arms flat, upturned. Prominent radula composed of thorn-like sclerotisations bordering a median flat ribbon-like sclerite. Hypandrium simple, unsclerotised, setose.

Dimensions.—Body length (in alcohol): 2·0 mm. Dimensions of other characters as in Table IV.

Hong Kong Island : on *Sterculia lanceolata*, 400 m. i, xii.58. Four ♂, 4 ♀.

The long bristle-like setae on head and thorax, venation of the fore wing, and the presence of "sense-clubs" in the axillar cell of the male fore wing serve to distinguish this species from *P. maculifrons* and *P. anomalus*.

Table IV.—*Length (in mm.) of various characters of* 4 *females and* 3 *males of* Pseudocaecilius hirsutus

	Females				Males		
Fw . .	2·740	2·660	2·430	2·800	2·510	2·200	2·360
Hw . .	.	2·110	1·930	2·200	2·000	1·760	1·860
Hf . .	0·575	0·565	0·520	0·565	0·520	0·475	0·495
Ht . .	0·955	0·955	0·875	0·985	0·900	0·835	0·845
t_1 . .	0·290	0·285	0·275	0·285	0·275	0·270	0·250
t_2 . .	0·120	0·125	0·115	0·125	0·130	0·115	0·120
A . .	1·970	.	1·940	2·060	.	2·060	2·110
f_1 . .	0·475	.	0·435	0·495	0·555	0·475	0·510
f_2 . .	0·300	.	0·290	0·320	0·335	0·305	0·325
Ratio t_1/t_2 .	2·42	2·28	2·39	2·28	2·12	2·35	2·08
Ratio f_1/f_2 .	1·58	.	1·50	1·55	1·66	1·56	1·57

Remarks.—Of 17 described species placed in *Pseudocaecilius*, only four have adequate descriptions and drawings of female genitalia—*P. citricola* (=*pretiosus*), *P. machadoi* Bad., 1955, *P. elutus* and *P. morstatti* End., 1913—and of these, in only *P. elutus* have the male genitalia been properly studied. Thus, apart from these four species, the three new species described here must be distinguished from others on characters other than the genitalia.

The following species have a definite fore wing pattern which is quite unlike that of any of the Hong Kong species : *P. machadoi*, *P. lachlani* End., 1903, *P. ornatus*, *P. maculosus*, *P. hispidus* End., 1913, *P. greenwoodi* Karny, 1926, *P. veitchi* Karny, 1926. *P. innotatus* has an extremely long pterostigma in the fore wing, *P. testaceus* End., 1903 has antennae which are much longer than those of the species described here, and *P. tenellus* has very much shorter fore wings. The Hong Kong species can be distinguished from *P. marshalli* Karny, 1926 on the colour of the antennae. *P. solocipennis* and *P. brevicornis* End., 1931, differ from *P. maculifrons* in lacking the dark spots on the head, from *P. anomalus* in lacking the pre-apical tooth on the claw, and from *P. hirsutus* in the ciliation of the hind wing. *P. brevicornis* resembles *P. hirsutus* in having long " rough " hairs on the head, but differs in the short flagellum, venation of the fore wing and ciliation of the hind wing.

In the four described species of which details of genitalia are provided, the subgenital plate is bilobed, with a single seta on each lobe. The three new Hong Kong species also have bilobed subgenital plates, but the lobes are less distinct and there are two or more setae on each lobe. The male of *P. elutus* resembles most closely *P. maculifrons* in hypandrium, phallosome, and ornamentation of the last tergite. While *P. maculifrons* shows some similarity to *P. anomalus* in ornamentation of the last tergite and in phallosome, the two species differ markedly in hypandrium. *P. hirsutus* is somewhat aberrant in both male and female genitalia, and in the fore wing. Roesler (1940) describes species of *Cladioneura* (*Scytopsocus*), from Brazil, as having *rs* and *m* of the fore wing connected by a cross-vein, and the axillar cell of

Figs. 16–19.—*Pseudocaecilius hirsutus*: (16) subgenital plate, female; (17) female gonapophyses; (18) phallosome; (19) right edge of ninth tergite of male. (All to common scale.)

the male fore wing with numerous "sense-clubs". *P. hirsutus*, however, lacks both the preapical tooth on the claw and hairs on the membrane of the fore wing. Nevertheless its reference to *Pseudocaecilius* is tentative, and its position may have to be revised at some future date.

Location of Material

The material before the author during descriptions, and the location of type material, is given below for each species. Unless otherwise stated, specimens were collected by the author.

Pseudocaecilius maculifrons

British Museum (Nat. Hist.): Holotype ♀ (dissected, tube 163, slides 163.1, 163.2) from *Pinus massoniana*, near Pokfulam Reservoir, Hong Kong Island, 7.ii.58; allotype ♂ (dissected, tube 135, slides 135.1, 135.2) same collecting data, 30.xii.57.

In author's collection, the following paratypes: 1 ♀ from *Pinus massoniana*, near Pokfulam Reservoir, Hong Kong Island, 5.viii.57; 1 ♀, same collecting data, 5.ix.57; 1 ♂, same collecting data, 11.xi.57; 2 ♀, same collecting data, 17.xii.57; 2 ♀, same collecting data, 30.xii.57; 2 ♀, same collecting data, 7.ii.58; 6 ♀, 7 ♂, same collecting data, 25.iv.58; 1 ♀, same collecting data, 24.iii.60; 2 ♀, 2 ♂, from *Pinus massoniana*, Chung Hum Kok, Hong Kong Island, 7.ii.58; 1 ♀, same collecting data, 20.ii.58; 4 ♀, 1 ♂, same collecting data, 28.v.60; 1 ♀ from *Pinus massoniana*, Mt. Davis Rd., Hong Kong Island, 17.iv.60; 1 ♂, 1 ♀ from *Pinus massoniana*, Tai Mo Shan (500 m.), New Territories, Hong Kong (*Miss E. Oxtoby*), 19.iv.60.

Pseudocaecilius anomalus

British Museum (Nat. Hist.): Holotype ♀ (dissected, tube 276, slides 276.1, 276.2, 276.3) beating shrubs, Peak (450 m.) (*N. Krauss*), v.58; allotype ♂ (dissected, tube 329, slides 329.1, 329.2) from *Sterculia lanceolata*, Peak (400 m.), Hong Kong Island, 5.iii.59.

In author's collection, the following paratypes: 1 ♂ from *Cunninghamia lanceolata*, High West (200 m.), Hong Kong Island, 12.vii.57; 1 ♀ from *Eurya japonica*, Peak (400 m.), Hong Kong Island, 8.viii.57; 1 ♂ from *Sterculia lanceolata*, Peak (400 m.), Hong Kong Island, 19.xii.58; 1 ♂, same collecting data, 5.iii.59.

Pseudocaecilius hirsutus

British Museum (Nat. Hist.): Holotype ♀ (dissected, tube 305a, slides 305.1, 305.2, 305.3) from *Sterculia lanceolata*, Peak (400 m.), Hong Kong Island, 19.xii.58; allotype ♂ (dissected, tube 305b, slides 305.4, 305.5) same collecting data and date.

In author's collection, the following paratypes: 3 ♀, 2 ♂, same collecting data and date as holotype ♀; 1 ♂, same collecting data, 5.iii.59; 1 ♀, beating broad-leaved shrubs, Hatton Rd., Hong Kong (*M. N. Adal*), 8.i.58.

References

Ashmead, W. H., 1879, On a new *Psocus*. *Canad. Ent.* **11**: 228–9.

Badonnel, A., 1931, Contribution a l'étude de la faune du Mozambique. 4e Note—Copéognathes. *Ann. Sci. nat., Bot. Zool.* **14**: 229–60.

—— 1946, Psocoptères du Congo belge. *Rev. Zool. Bot. afr.* **39**: 137–96.

—— 1948, Psocoptères du Congo belge (2e note). *Ibid.* **40**: 266–321.

—— 1951, Ordre des Psocoptères. *In* Grassé, P.-P., *Traité de Zoologie* **10** (2). Paris.

—— 1955, Psocoptères de l'Angola. *Publ. cult. Cia. Diamant. Angola* **26**: 1–267.

Banks, N., 1920, New neuropteroid insects. *Bull. Mus. comp. Zool. Harv.* **64** : 299–362.

—— 1937, Philippine neuropteroid insects. *Philipp. J. Sci.* **63** : 125–74.

Chapman, P. J., 1930, Corrodentia of the United States of America : I. Suborder Isotecnomera. *J. N. Y. ent. Soc.* **38** : 219–90, 319–403.

Enderlein, G., 1903, Die Copeognathen des Indo-Australischen Faunengebietes. *Ann. hist. nat. Mus. hung.* **1** : 179–344.

—— 1907, Neue Beiträge zur Kenntnis der Copeognathen Japans. *Stettin. ent. Ztg.* **68** : 90–106.

—— 1913, Beiträge zur Kenntnis der Copeognathen, I, II. *Zool. Anz.* **41** : 354–60.

—— 1926, Die Copeognathen-Fauna Javas. *Zool. Meded.* **9** : 50–70.

—— 1931, Die Copeognathen-Fauna der Seychellen. *Trans. Linn. Soc. Lond.* (*Zool.*) (2) **19** : 207–40.

Karny, H. H., 1926, On some tropical Copeognatha, especially from the Fiji Islands. *Bull. ent. Res.* **16** : 285–90.

Mockford, E. L. and Gurney, A. B., 1956, A review of the psocids, or booklice and barklice, of Texas (Psocoptera). *J. Wash. Acad. Sci.* **46** : 353–68, figs. 1–53.

Navas, R. P. L., 1934, Insectos de la India. *Rev. Acad. Cienc. Zaragoza* **17** (1933) : 29–48.

Roesler, R., 1940, Neue und wenig bekannte Copeognathen gattungen II. *Zool. Anz.* **130** : 1–25.

THE DIAGNOSTIC CHARACTERS, SCOPE AND GEOGRAPHICAL DISTRIBUTION OF THE SUBFAMILY ROMALEINAE (ORTHOPTERA : ACRIDIDAE)

By B. P. Uvarov and V. M. Dirsh
(*Anti-Locust Research Centre, London*)

A difference of opinion which arose recently with regard to the characters and the scope of the acridid subfamily Romaleinae (Roberts, 1941 ; Uvarov, 1943 ; Dirsh, 1956) and culminated in a series of papers, some of them unduly polemical, by Rehn and Grant (1959, 1959*a*, *b*, *c*), makes it necessary to review critically the available evidence.

Diagnostic Characters

The subfamily Romaleinae was established by Roberts (1941), mostly on the basis of the phallic complex. In his tabulation of structural differences between subfamilies, nine characters of Romaleinae were listed, all except one " not entirely limited to the group in question ". These and other characters are discussed below in the light of more recent data.

" *Arch of aedeagal valves absent* "

While Roberts regarded the absence of this structure (termed " arch of cingulum " by Dirsh (1956)) as not limited to Romaleinae, Rehn and Grant (1959*c* : 114) considered that this character separates Romaleinae from all other subfamilies except Acridinae (including Truxalinae), in which " certain genera lack the arch of the aedeagal valves ".

The examination of the genitalia of 25 New World genera referred by Rehn and Grant to Romaleinae, available to us, has shown that a well-developed arch of cingulum is present in *Munatia* and *Diponthus* (not a member of the Romaleinae, see p. 157) (as well as in *Prionacris*). In the sketches of the phallic complex of the former two genera given by Rehn and Grant (1959*b* : figs. 8, 139), the arch is omitted, although it is certainly present in *Diponthus paraguayensis* Bruner (fig. 1).

On the other hand, the arch of cingulum is absent in many genera of Catantopinae (e.g. *Buforania*, *Taeniophora*, *Ommatolampis*, *Bactrophora* etc.), Chilacridinae (*Chilacris*, *Aucacris*, *Bufonacris*, *Philippiacris*), Acridinae (*Pycnodictya*, *Calephorus*), Truxalinae (*Truxalis*, *Brachycrotaphus*, *Dociostaurus*, *Achurum*) and Eremogryllinae (*Eremogryllus*). The arch is very poorly developed in many other genera of Catantopinae, Acridinae, Truxalinae and Egnatiinae, appearing sometimes only as a slightly sclerotised part of the ectophallic membrane. It is, in fact, not even a definite anatomical entity, but a minor modification varying in the degree of its development without correlation with taxonomy.

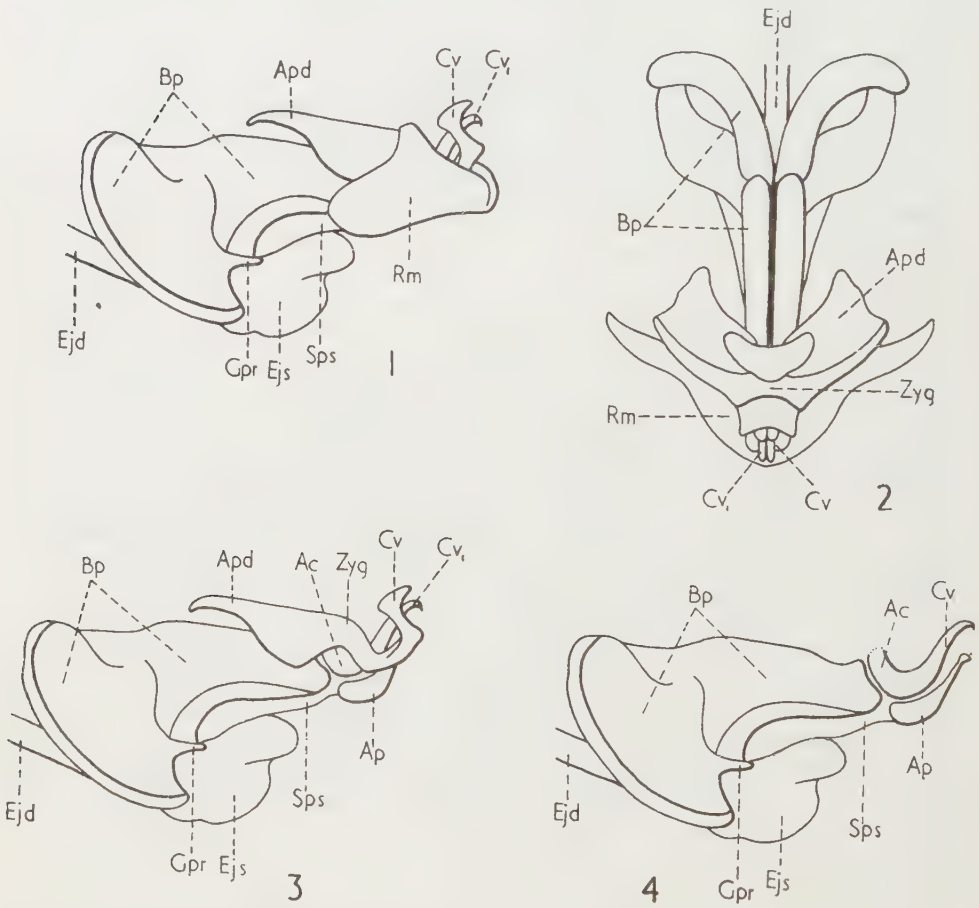
"*Aedeagal valves relatively short and may be moved independently of each other* "

This is the only feature which Roberts (*l.c.*) regarded as confined to Romaleinae but according to Rehn and Grant (1959*b* : 234) " the dorsal aedeagal valves, however, are the most variable structures of the endophallus ". In fact, they may be absent, small, large and sculptured, or highly specialised. The ventral valves were described by these authors as "almost never sclerotised or otherwise developed, though more so in two tribes". These statements effectively disposed of this character as diagnostic for Romaleinae. As regards the valves being fused or articulated, this depends on

the degree of sclerotisation at their bases, which is most difficult to judge, while their ability of independent movement can hardly be reliably detected on preserved material.

"*Apodemes of cingulum relatively broad, plate-like, never heavy thick rods*"

Roberts did not regard this character as limited to the group and its uncertain value was confirmed by Rehn and Grant (1959*b* : 234), who stated that " the apodemes may be reduced in width and at the same time elongate " ; they described the apodemes in the tribe Romaleini (*l.c.* : 253) as " somewhat narrow ", and in Zoniopodini (*l.c.* : 260) as " relatively narrow and elongate ". We can only confirm that the relative width of the apodemes is variable and has no diagnostic value for the subfamily.



Figs. 1–4.—Phallic complex of *Diponthus paraguayensis* Bruner : (1) epiphallus and ectophallic membrane removed, lateral view ; (2) the same, view from above ; (3) lateral view, rami of cingulum removed, to show *Cv* (valve of cingulum) ; (4) the same, whole cingulum severed from arch of cingulum (*Ac*) and removed. *Ac*, arch of cingulum ; *Ap*, apical valve of penis ; *Apd*, apodeme of cingulum ; *Bp*, basal valve of penis ; *Cv*, valve of cingulum originated from zygoma region ; Cv_1, valve of cingulum originated from arch of cingulum ; *Ejd*, ejaculatory duct ; *Ejs*, ejaculatory sac ; *Gpr*, gonopore process ; *Rm*, ramus of cingulum ; *Sps*, spermatophore sac ; *Zyg*, zygoma of cingulum.

"*Ventral infold relatively large*"

This is a very indefinite and variable structure not considered by Roberts as characteristic for Romaleinae and not even mentioned by Rehn and Grant.

" *Follicles of testis radiate from vas deferens*"

This arrangement of the follicles is also found in Pyrgomorphidae, Ommexechidae, Pamphagidae and in some Catantopinae (Laird, 1943 ; Rehn and Grant, 1959*c* : 115). It should be added that too few genera of other families and subfamilies have been studied in this respect and it is, at least, premature to attach diagnostic value to this character, which is also known to be unstable within a single subfamily and even in the same species (*Schistocerca americana* (Drury), *see* Laird, 1943).

" *Diverticulum of spermatheca recurved*"

This type of structure is so common and widespread in Acridoidea (except perhaps in the Eumastacidae, which were not sufficiently studied in this respect) that it cannot possibly be used to characterise Romaleinae.

" *Apical diverticulum usually absent or very small*"

Dirsh (1956) tended to regard a reduction of the apical (pre-apical, in his terminology) diverticulum as a characteristic of Romaleinae, but Rehn and Grant (1959*c* : 115) pointed out that in " fact the structure is quite variable in the present subfamily " and in two tribes this diverticulum is well developed, while it is absent in *Spaniacris* (Rehn and Grant, 1960 : 3). Moreover, within the same genus, the diverticulum is reduced in *Colpolopha bruneri* Rehn, but very long and slender on *C. obsoleta* (Serville) (Rehn and Grant, 1959*c* : 247, figs. 34, 40). These considerations undermine the diagnostic value of the character.

" *Glandular pouches of female usually present*"

These pouches (or Comstock-Kellog glands) are found in unrelated groups of Catantopinae as well as in some, but not all, Romaleinae and in Egnatiinae (Bryantseva, 1953) but their occurrence throughout Acridoidea is still insufficiently studied to assess their taxonomic importance. They clearly do not help to separate Romaleinae from Catantopinae.

" *Distal outer spine of hind tibia present*"

This character, which is present in the New World genera of Romaleinae but absent in the Old World ones (Dirsh, 1956) and in *Spaniacris* (Rehn and Grant, 1960 : 3), has been regarded in the past as of great taxonomic value, but all recent acridologists (including Rehn, 1956), agree that it is very unstable and cannot be used for separating subfamilies.

Thus, none of the features used by Roberts to characterise the subfamily can be regarded as satisfactory for the purpose, whether used singly or in combination. This view was supported by Agarwala (1952–53), who suggested that the group does not deserve even subfamily rank.

Rehn and Grant (1959*b*, *c*) used the majority of characters recorded by Roberts and added one more (1959*c* : 114) :

" *Epiphallus bridge-type, variable, but ancorae and lophi present and fused to disc*"

These features, however, are quite common in Catantopinae and often occur in other subfamilies. Moreover, it is often almost impossible to decide whether ancorae are articulated or fused with the disc.

In stressing the difference of Romaleinae from Acridinae, Rehn and Grant (1959*c* : 113) stated that " certain genera (of Acridinae) lack the arch of the aedeagal valves, but in these cases the form of the epiphallus is distinctive in having the ancorae as separate elements which articulated with the disc ". They did not specify the genera but, amongst Acridinae, in the genera *Acteana, Machaeridia, Paraparga* and *Parga*, ancorae are completely absent. In *Amphicremna* they are reduced and fused with the disc as in Romaleinae, Cyrtacanthacridinae and in most of the Catantopinae. This means that fused ancorae have no special taxonomic value in characterising Romaleinae.

Female ovipositor

Agarwala (1952–53) in his study of the ovipositor and associated structures in Acrididae, failed to find any reliable differences between Romaleinae and Catantopinae.

Stridulatory mechanism

Dirsh (1956 : 249 ; 1961 : 393, fig. 20) has pointed out that Romaleinae possess a unique type of sound-producing mechanism, described as follows : the first vannal area of the wing is narrow and its membrane is convex and covered with arched, parallel, transverse veinlets, which are serrated ; when the wing is flexed, it forms a tube-like fold, with the serrated veinlets rubbing against the veins of the elytron, which are strongly raised. The cubital, the second vannal and usually the medial areas of the hind wing are expanded, and each also has a row of regular, parallel, thickened transverse veinlets ; these areas probably serve as resonators. This specialisation can be observed even in the rudimentary wings of *Phrynotettix, Dracotettix, Brachystola, Kabulia* and *Acrostegastes.*

Rehn and Grant (1959*c* : 111, 118) accepted this stridulatory mechanism as one of the subfamily characters, but did not admit its special diagnostic value. Indeed, their long enumeration of external morphological features of the subfamily led them to the conclusion that " in external morphology no single character or combination of characters will at once distinguish members of Romaleinae " (1959*c* : 113).

Conclusion

The above discussion shows that none of the characters suggested by Roberts and by Rehn and Grant as diagnostic for the subfamily can be so regarded. We consider, however, that Romaleinae can be defined by the following characters :

1. *Stridulatory specialisation, which is present in almost all genera, even micropterous ones.* It may be reduced, but still definite, as in *Aplatacris*, the hind wings of which are parchment-like, or in *Munatia*, in which weak traces of serration on veinlets can be discerned, suggesting a secondary reduction.

2. *Lower basal lobe of hind femur as long as the upper one.* This character (noted by Uvarov, 1943, but not mentioned by Rehn and Grant, 1959*c*) occurs again in Dericorythinae and Chilacridinae, which have no stridulatory specialisation.

3. *Flexure of valves of penis more robust than usual in other subfamilies.* (Not an exclusive character.)

The following formal diagnosis of the subfamily is offered :

Subfamily Romaleinae

Type genus : Romalea Serville, 1831.

Size mostly large or medium. Body and head of variable shape. Prosternal process present. Mesosternal interspace open. Highy specialised stridulatory mechanism present ; first vannal

area of hind wing narrow, convex, forming tube-like fold when wing is folded ; this area with arched, parallel, finely but strongly serrated, transverse veinlets ; sometimes longitudinal veins serrated as well ; cubital, second vannal and sometimes medial area expanded, with thickened, regular, transverse veinlets. Lower basal lobe of hind femur about as long as upper one. External apical spine of hind tibia present or absent. Basal and apical valves of penis connected by strong, thickened flexure. Epiphallus robust, bridge-shaped, with short ancorae and lophi.

The Scope of the Subfamily

According to the above definition, the scope of the subfamily, as given by Rehn and Grant (1959*c*), requires some modification. Thus their tribe Diponthini, in which stridulatory specialisation is absent and all other characters are inconclusive, must be excluded from Romaleinae. On the other hand, the genus *Prionacris*, excluded from the subfamily by Rehn and Grant (1959*a*) because of the presence of the arch of cingulum and the shape of apodemes discussed above and found unreliable (p. 153), should be restored to Romaleinae. The same applies to the Old World genera *Teratodes*, *Pelecinotus*, *Robecchia*, *Kabulia*, *Lyrotylus* and *Lyrotyloides*, an analysis of the characters of which, according to Rehn and Grant (1959) " rules out the possibility " that they belong to Romaleinae. Since the characters which these authors regarded as " especially diagnostic " for these genera, in the sense of definitely excluding them from Romaleinae, have all been discussed above, we need merely enumerate them and refer to the relevant arguments above :

" *Apodemes of cingulum rod-like, not plate-like* ", see p. 154.

" *Dorsal aedeagal valves arched with a sclerotised element which connects to the median area of the zygoma of the cingulum—a condition unknown in Romaleinae* " ; the concluding words are not warranted, see p.153.

" *Dorsal aedeagal valves bridged* (*fused*), *not free and capable of independent movement which is characteristic of Romaleinae* ", see p. 153.

" *Distal portion of pre-apical diverticulum of* ♀ *spermatheca not recurved*"; the value of spermathecal structure is dubious (p. 155), and it might be noted that the pre-apical diverticulum of *Batrachacris viridis* (Blanchard) as figured by Rehn and Grant (1959*c* : 270, fig. 145) is certainly not recurved.

While, therefore, the anatomical characters observed by Rehn and Grant do not bar the Old World genera from the subfamily, they all possess stridulatory specialisation, otherwise found only on Romaleinae, which was ignored by Rehn and Grant in one paper (1959*b*), but admitted in another (1959*c*). Since biogeographical considerations, which apparently influenced the views of these authors, carry no weight (see p. 158 below), it would be against all reasoning to exclude the Old World genera from the subfamily Romaleinae.

The subfamily Romaleinae was divided by Rehn and Grant (1959*b*) into 17 tribes, comprising 39 genera (out of the total of " approximately 36 ", *see* Rehn and Grant 1959*c*, 1960). Six of the tribes are monogeneric, five bigeneric, three consist of three genera each, one includes four, and two tribes five genera each. It is sometimes inevitable that some tribes in a large subfamily may be monogeneric or small, but the usefulness of such splintering as suggested for Romaleinae appears questionable, since almost half of their tribes are quite, or almost, equated to genera.

Out of these tribes all, except Phrynotettigini, are listed as new. However, the group names Romaleae and Zoniopodae had been used already by Brunner in 1893 and the tribe Tropidacrini was formally established as such by Liebermann (1939) and nine other tribes by the same author in 1953 (*see* Liebermann, 1959). The genus *Batrachacris* Uvarov, 1939, after which the tribe Batrachacrini was named by Rehn and Grant (1959*c* : 270), was synonymised by Liebermann (1943) with *Antandrus* Stål, 1878, and the tribal name, accordingly, should be Antandrini. The Old World genera should constitute the tribe Teratodini.

List of Genera Examined :

Acrostegastes Karsch, 1896
Aeolacris Scudder, 1875
Agriacris Walker, 1870
Alcamenes Stål, 1878
Alophonota Stål, 1873
Antandrus Stål, 1878
Aplatacris Scudder, 1875
Brachystola Scudder, 1876
Callonotacris Rehn, 1909
Chariacris Walker, 1870
Chromacris Walker, 1870
Cibotopteryx Rehn, 1905
Colpolopha Stål, 1873
Coryacris Rehn, 1909
Draconata Pictet and Saussure, 1887
Dracotettix Bruner, 1889
Eurynotacris Ramme, 1931
Eutropidacris Hebard, 1923
Kabulia Ramme, 1928
Legua Walker, 1870
Lophacris Scudder, 1869
Lyrotyloides Bey-Bienko, 1956
Lyrotylus Uvarov, 1923
Munatia Stål, 1875
Pelecinotus I. Bolivar, 1881
Phrynotettix Glover, 1872
Prionacris Stål, 1878
Prionolopha Stål, 1873
Procolpia Stål, 1873
Robecchia Schulthess, 1898
Romalea Serville, 1831
Taeniopoda Stål, 1873
Teratodes Brulle, 1835
Titanacris Scudder, 1869
Tropidacris Scudder, 1869
Tropidostethus Philippi, 1863
Tytthotyle Scudder, 1897
Xestotrachelus Bruner, 1913
Xyleus Gistl, 1848
Zoniopoda Stål, 1873

Geographical Distribution

Dirsh (1956) referred certain Old World genera to the predominantly South American subfamily Romaleinae, with a comment that " the occurrence of Romaleinae in these two widely separated areas is not, of course, without parallel in other groups of animals and plants ". According to Rehn and Grant (1959) such " a broad assumption is certainly not endorsed by those of wide acquaintance, in the field and in the laboratory, with the biota of the arid and semi-arid parts of the New World. It should be noted that the Holarctic elements in the Nearctic fauna are, as a rule, not inhabitants of the more arid parts of North America, and are more generally limited to its Boreal life zone, where no members of Romaleinae occur." Such reasoning completely misses the point, since by no stretch of the imagination could one regard the genera of Romaleinae, found only in the semi-arid subtropics of Eastern Africa, Southern Iran, Pakistan and India, as Holarctic faunistic elements. This is an essentially different pattern of distribution and the following new examples illustrate the wide occurrence of this pattern implied by Dirsh (*l.c.*).

Amongst reptiles, two families Amphisbaenidae and Pelomedusidae occur only in tropical Africa and South America ; the genus *Amphisbaena* of South America and the West Indies is represented by one species in Africa ; the subfamily Erycinae, essentially xerothermic in its habits, is represented in north-eastern Africa, south-western Asia, India and Ceylon by the genus *Eryx*, while its genera *Charina* and *Lichanura* are restricted to the arid south-western North America (Darlington, 1957 : 210, 220, 223).

Among the birds, the flamingo family (Phoenicopteridae) is now represented in widely scattered localities in Africa, Madagascar, southern Europe, western Asia to India, and in the warmer parts of America, from northern Mexico, the West Indies and the Florida Keys (Darlington, 1957 : 293).

Turning to insects, it is appropriate to quote the following lines : " The morphologically very distinct subfamily Polyphaginae is made up of genera that are largely desert forms, ... The greater number of the genera, and the bulk of species, are Palaearctic, with others arid Ethiopian. In Neogaea we have representatives of the subfamily in North America and in Mexico " (Rehn, 1958 : 296). Bearing in mind

that the conventional term " Palaearctic " covers, in this case, the southernmost desert fringes of the region in Africa and south-western Asia, the distribution of these desert cockroaches is certainly not Holarctic.

An even more appropriate example is offered by the locust genus *Schistocerca*, which is represented by a large number of species in Southern and Central America, with a few penetrating to North America, while one species, the well-known Desert Locust (*Schistocerca gregaria* (Forsk.)) populates very nearly the same areas in Africa and south-western Asia as the disputed genera of Romaleinae (this example is also referred to by Rehn, 1958 : 264).

Such examples could be multiplied and one cannot but agree with Darlington (1952 : 216) " that it is a fact beyond argument that some living South American invertebrates are related to tropical African forms ".

As regards plants, Engler (1914) stressed some striking affinities between xerothermic floras of Africa and America. Such genera as *Commiphora* and *Fagonia*, most typical of arid subtropics of Africa and south-western Asia, are related to *Bursera* of South and Central America, while the genera *Scutia* (Rhamnaceae) and *Lycium* (Solanaceae) are represented in these two widely-separated regions by different species. In fact, Good (1953 : 386) records no less than 62 genera of plants found only in America and Africa. He also records amongst " species-pairs " *Loudetia flammula* from tropical south America and *L. phragmatoides* from tropical Africa (*l.c.* : 210). The point of view of plant geographers was summed up by Camp (1952 : 208) in the following words : " There is a series of groups which seem not to be intimately connected with the main transtropic trend and which trend from S. America to Africa as often as in reverse direction " ; such Afro-South American trend is shown by 11 plant families.

Thus, the present discontinuous distribution of Romaleinae is anything but exceptional and entirely invalid as an argument for excluding the Old World Teratodini from this subfamily.

References

Agarwala, S. B. A., 1952–53, A comparative study of the ovipositor in Acrididae. *Ind. J. Entom.* **13** : 147–81 ; **14** : 61–75 ; **15** : 53–69 ; 299–318.

Brunner von Wattenwyl, C., 1893, Revision du système des Orthoptères et description des espèces rapportées par M. Leonard Fea de Birmanie. *Ann. Mus. Stor. nat. Genova* **13** : 1–230.

Bryantseva, I. B., 1953, Peculiarities in the structure of the fore gut of Acridids of the subfamily Egnatiinae (Orthoptera, Acrididae). *Rev. Ent. URSS* **33** : 194–7.

Camp, W. H., 1952, Phytophyletic patterns of lands bordering the South Atlantic basin. *Bull. Amer. Mus. Nat. Hist.* **99** : 205–212.

Darlington, P. Y., 1952, Living invertebrates and Mesozoic South America. *Ibid.* **99** : 213–16.

—— 1957, *Zoogeography.* New York and London.

Dirsh V. M., 1956, The phallic complex in Acridoidea (Orthoptera) in relation to taxonomy. *Trans. R. ent. Soc. Lond.* **108** : 223–56.

——, 1961, A preliminary revision of the families and subfamilies of Acridoidea (Orthoptera Insecta). *Bull. Brit. Mus.* (*Nat. Hist.*) (*Ent.*) **10** : 351–419, 34 figs.

Engler, A., 1914, Über Herkunft, Alter und Verbreitung extremer xerothermer Pflanzen. *Sitzber. Kön. Preuss. Acad. Wiss.* **20** : 564–621.

Good, R., 1953, *The geography of flowering plants.* Second edition. London.

Laird, A. K., 1943, A study of the types of male gonads found in the Acrididae. *J. Morph.* **72** : 477–90, 4 figs.

Liebermann, J., 1939, Las Tropidacrini de la Region neotropical. *Physis* **17** : 589–600.

—— 1943, Generos y especies de nuevos Acridoideos Chilenos. *Rev. Soc. ent. Argentina* **11** : 400–10.

—— 1959, Algunas observaciones acerca de las ultimas publicaciones de J. A. G. Rehn y H. S. Grant sobre " Romaleidae " (Orth., Acrid.). *Ibid.* **22** : 104–5.

Rehn, J. A. G., 1956, Observations on several characters which have been used as primary differential criteria in the classification of the Cyrtacanthacridinae (Orthoptera, Acrididae). *Ent. News, Philadelphia* **67** : 1–4.

—— 1958, The origin and affinities of the Dermaptera and Orthoptera of Western North America. *Publ. Amer. A.ss Advanc. Sci.* Bull. No. **51** : 253–98.

—— and Grant, H. J., Jr., 1959, On certain Old World genera of Teratodini recently placed in the subfamily Romaleinae (Orthoptera ; Acridoidea ; Acrididae). *Not. Nat.* **317** : 1–9.

—— —— 1959*a*, The correct placement of the genus *Prionacris* (Orthoptera ; Acrididae ; Cyrtacanthacridinae). *Ibid.* **323** : 1–3.

—— —— 1959*b*, An analysis of the tribes of the Romaleinae with special reference to their internal genitalia (Orthoptera ; Acrididae). *Trans. Amer. ent. Soc.* **85** : 233–71.

—— —— 1959*c*, A review of the Romaleinae (Orthoptera, Acrididae) found in America north of Mexico. *Proc. Acad. Nat. Sci. Philad.* **111** : 109–271.

—— —— 1960, An additional tribe of the Romaleinae (Orthoptera; Acrididae). *Not. Nat.* **327** : 1–4.

Roberts, H. R., 1941, A comparative study of the subfamilies of the Acrididae (Orthoptera) primarily on the basis of their phallic structures. *Proc. Acad. Nat. Sci. Philad.* **93** : 201–46.

Uvarov, B. P., 1943, The tribe Thrinchini of the subfamily Pamphaginae, and the interrelation of the Acridid subfamilies. *Trans. R. ent. Soc. London* **93** : 1–72.

HADROPHANURUS KARNALENSIS SP. N. (HYMENOPTERA : SCELIONIDAE), A PARASITE OF *BAGRADA CRUCIFERARUM* KIRKALDY (HEMIPTERA : PENTATOMIDAE)

By M. J. Chacko and R. N. Katiyar

(*Division of Entomology, Indian Agricultural Research Institute, New Delhi*)

During a survey of insect parasites, the eggs of *Bagrada cruciferarum* Kirkaldy observed on the leaves of maize in September and October, 1957, at Karnal, India, were found to be parasitised by a species of *Hadrophanurus*[1] (Scelionidae). This is the first record of this genus from India, the only species so far recorded being *H. pennsylvanicus* (Ashmead) from U.S.A. The present species differs from it and is described below as new.

Hadrophanurus karnalensis sp. n.

Female

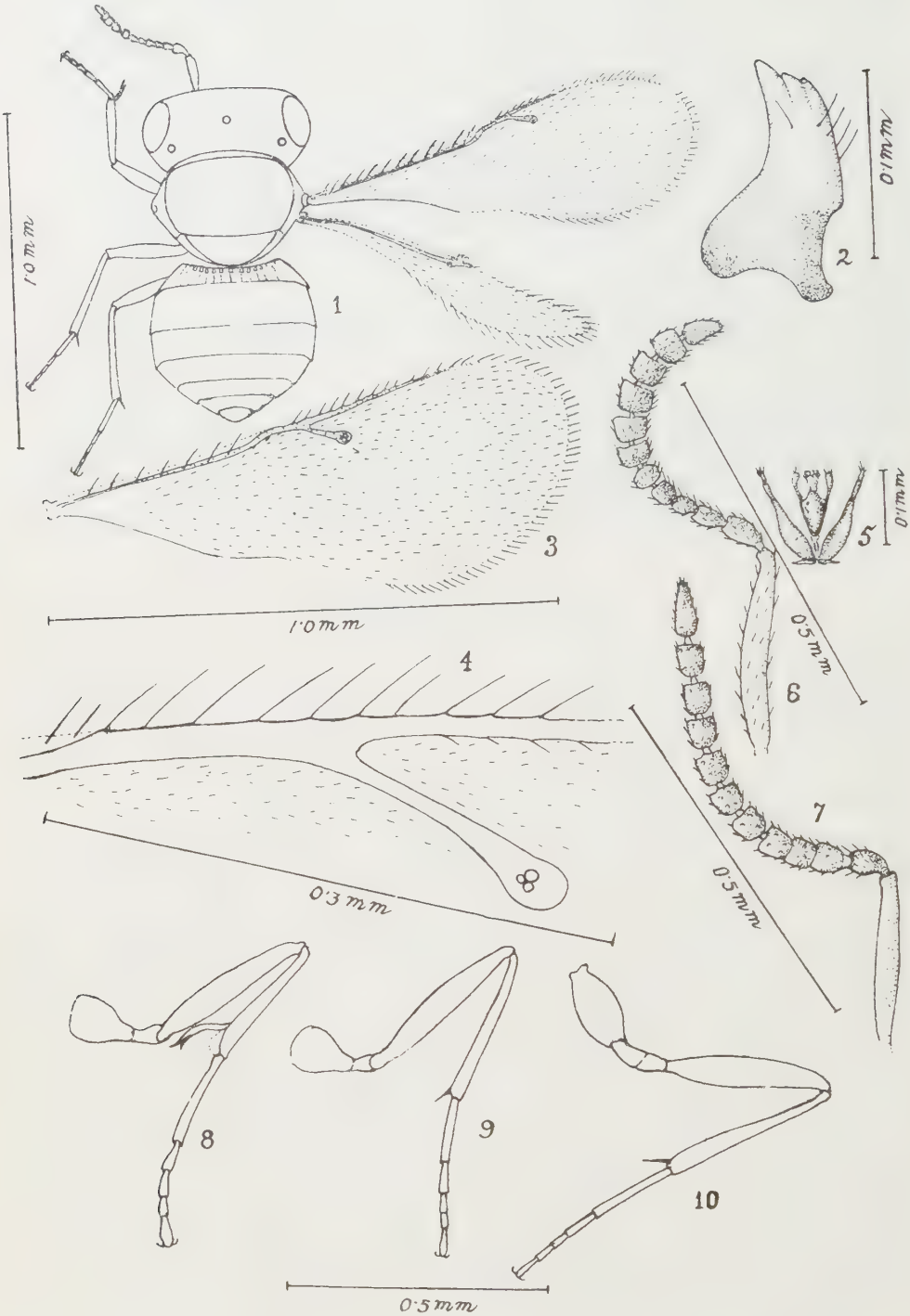
Coloration : head and thorax blackish, first 4 abdominal segments brownish-yellow, fifth yellowish-brown, sixth and seventh brownish ; scape brownish-yellow, second and third antennal segments yellowish-brown, fourth to twelfth segments brownish ; wings transparent, veins and hairs yellowish-brown ; legs yellowish, coxae brownish ; proximal two-thirds of fore femur yellowish-brown ; third and fourth tarsal segments of fore leg and mid leg, and second to fourth tarsal segments of hind leg yellowish-brown ; fifth tarsal segments brownish.

Head : finely hairy, slightly broader than thorax, closely reticulate ; frons with a median longitudinal shallow depression with transverse striations and with a small keel at the base of the antennae ; ocelli 3, placed in depressions, distance between median and lateral ocelli slightly more than half distance between lateral ocelli ; lateral ocelli very close to, but not touching, eyes ; antenna 12-segmented, with a club ; scape long and slender, second and third segments narrow proximally, broader distally ; second segment longer than third ; fourth, fifth and sixth more or less globular, seventh to eleventh broader than long, and twelfth conical at tip ; scape sparsely hairy, rest of segments hairy ; mandible 3-dentate, and with a few hairs ; maxillary palpi 2-segmented, labial palpi 1-segmented.

Thorax : finely hairy, slightly arched, broad and round anteriorly, and narrowed posteriorly ; pronotum not visible from above ; mesonotum pitted and aciculate in between the pits ; parapsidal furrows absent ; metanotum narrow ; lines of union of scutellum with metanotum and of metanotum with propodeum with a row of pits ; lines of union of propleuron with mesopleuron, mesopleuron with metapleuron, and metapleuron with pleuron of propodeum also with a row of pits. Fore wing with submarginal, marginal, postmarginal and stigmal veins ; submarginal with a few long hairs ; marginal and stigmal veins almost equal in length ; postmarginal without any definite termination. Fore femur longer than tibia ; tibia with a bifid, curved apical spur ; first tarsal segment longest, three-fourths length of tibia ; mid tibia slightly shorter than femur and with a small apical spur ; first tarsal segment longest ; hind femur stout, longer than tibia, which has a small apical spur ; first tarsal segment longest, almost half length of tibia.

Abdomen : coarse, almost as long as broad ; first segment narrow, its tergite having pits along anterior margin and longitudinal raised striations ; second segment largest ; posterior half of second and third tergites finely reticulate ; third to seventh segments progressively narrower.

[1] Identified by Dr. B. R. Subba Rao, Division of Entomology, Indian Agricultural Research Institute, New Delhi 12.



Figs. 1–10.—*Hadrophanurus karnalensis* sp. n. (1–6) *Female*: (1) adult; (2) mandible; (3) fore wing; (4) wing, part showing marginal, postmarginal and stigmal veins; (5) labial and maxillary palpi; (6) antenna. (7) *Male*, antenna. (8–10) *Female*: (8) fore leg; (9) mid leg; (10) hind leg.

Male

Head, thorax and abdomen blackish. Antenna 12-segmented, scape brownish-yellow, second to fifth segments yellowish-brown, sixth to twelfth brownish.

Length : ♀, 1·2 mm. ; ♂, 1·0 mm.

Hadrophanurus karnalensis sp. n. differs from *H. pennsylvanicus* (Ashm.), the only other described species of this genus, in the following respects : in *H. karnalensis* the head and thorax of the female are blackish and the first four abdominal segments brownish-yellow, and the marginal and stigmal veins are almost equal in length. In *H. pennsylvanicus* the body is dark brown and the marginal vein is somewhat longer than half the stigmal vein.

Holotype ♀, *allotype* ♂, on card mounts ; 2 *paratypes* (♀ and ♂), dissected and mounted on microslides. India : Karnal, September, 1957, from eggs of *Bagrada cruciferarum* Kirkaldy (*R. N. Katiyar*). In National Collection (Pusa).

Acknowledgments

Our thanks are due to Dr. E. S. Narayanan, Head of the Division of Entomology, Indian Agricultural Research Institute, for providing the necessary facilities and to Dr. M. G. Ramdas Menon, Systematic Entomologist for going through the manuscript.

DESCRIPTION OF A NEW SPECIES OF *MYSTROCNEMIS* (HYMENOPTERA : BETHYLOIDEA : SCLEROGIBBIDAE) FROM INDIA

By Chandy Kurian and K. Mathen

(Central Coconut Research Station, Kayangulam, Kerala, India)

The type specimens of the new form described in this paper are from the collections of Professor T. N. Ananthakrishnan, Department of Zoology, Loyola College, Madras. They are being sent to the Zoological Survey of India, Indian Museum, Calcutta. We thank Dr. K. P. V. Menon, Director, Central Coconut Research Station, Kayangulam for the facilities afforded in carrying out this work.

The superfamily Bethyloidea represents a heterogeneous assemblage of Hymenopterous parasites. The bethylids have been placed by different workers in different superfamilies, such as Serphoidea by Kieffer and Vespoidea by Ashmead. We have followed Brues and Melander (1932) and Pruthi and Mani (1942) in treating the group as an independent superfamily.

The Sclerogibbidae (Richards, 1939 ; Reid, 1941) are a very rare and poorly known group. They are characterised by : antenna with 17–40 segments, inserted close to clypeus, cylindrical ; mouth ventral, at least in apterous forms ; fore wing with two or three closed basal cells, one closed radial cell and often one closed cubital cell ; females mostly apterous and males winged.

The genus *Mystrocnemis* is differentiated from the rest of the genera by the following characters : claws slender, with a tooth in the middle ; head rostrate ; fore tibia flattened ; antenna with 17–24 segments.

Females of the species of *Mystrocnemis* recorded from the Oriental region may be distinguished thus :

Antenna 24-segmented (*Ceylon*) . . .	*embiidarum* Kieffer
Antenna 22-segmented (*Burma*) . . .	*erythrothorax* Kieffer
Antenna 17-segmented (*Madras, India*) . .	*madrasensis* sp. n.

Mystrocnemis madrasensis sp. n.

Female

Length : 2 mm.

Colour : Head and abdomen reddish-brown, thorax honey-brown.

Head : much broader than thorax ; viewed from above slightly wider than long ; mouth yellowish-brown, palpi yellow ; eyes sparsely pubescent ; vertex margined ; ocelli absent. Antenna yellowish-brown, 17-segmented, arising from the mouth border, far below an imaginary line joining the lower orbital borders ; scape light yellowish-brown ; first few flagellar joints broader than long, apical segments becoming slightly narrowed and the last, which is somewhat attenuated or tapering apically, one and a half times as long as broad. Remaining details shown in figure 1.

Thorax : Prothorax somewhat bulging anteriorly, about one and a half times as long as wide ; mesonotum about half length of pronotum, anteriorly somewhat narrowed ; scutellum absent ; wings absent. Length of propodeum : nearly equal to width and two-thirds of the pronotum, very slightly wider than pronotum ; roughly coriaceously sculptured, with a leathery appearance.

Legs : yellowish-brown. Fore leg (fig. 2) : coxa nearly 3 times length of trochanter ; femur swollen, length one and a half times the width, one and two-thirds as long as coxa and trochanter combined; tibia flattened, three-fifths length of femur, tibial spur one-third, metatarsus nearly two-fifths length of tibia. Mid leg : smaller than fore leg, femur nearly as long as coxa and trochanter combined ; tibia as long as coxa and slightly shorter than femur ; metatarsus slightly

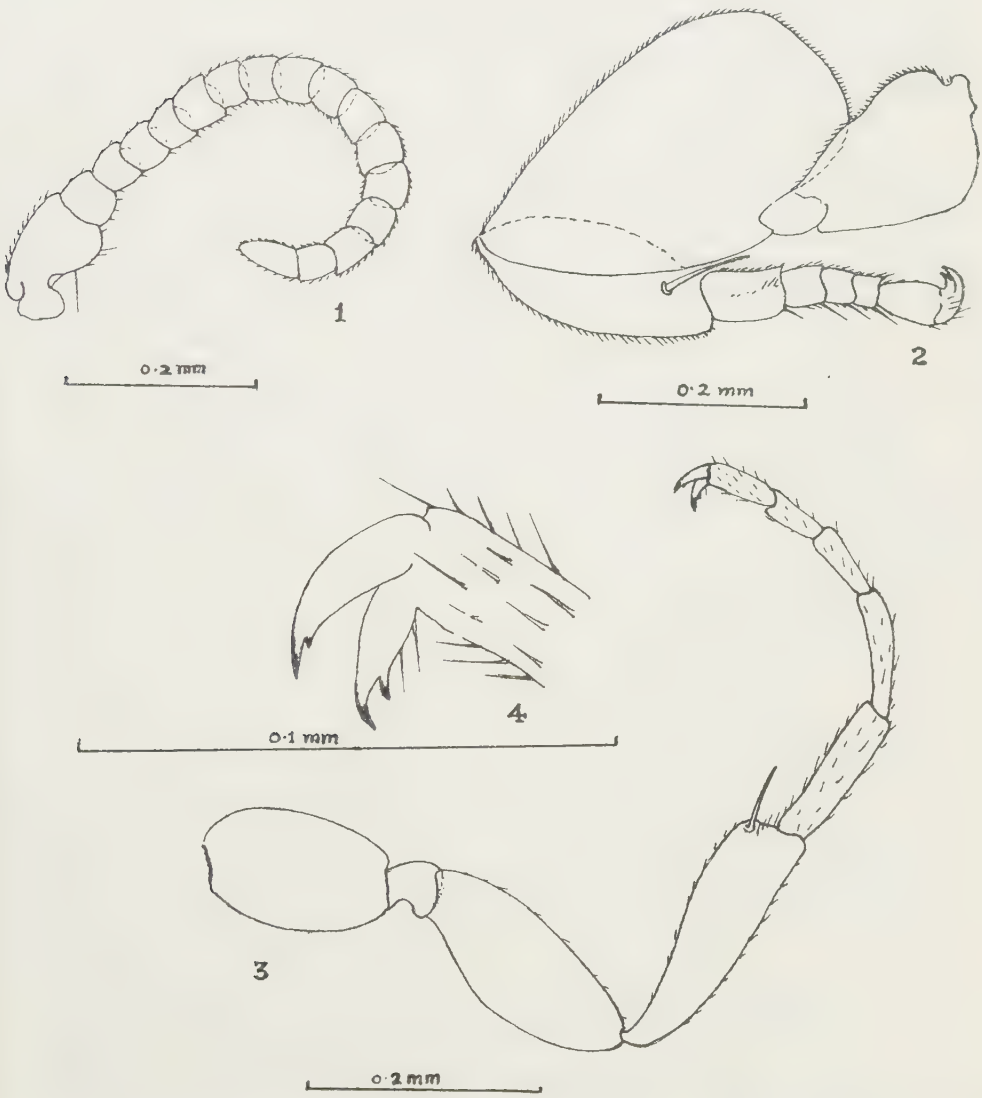
more than half length of tibia and one-third rest of tarsi combined. Hind leg (fig. 3) : coxa one and one-third as long as broad ; femur slightly longer than coxa and trochanter combined ; tibia very slightly longer than femur, tibial spur half length of metatarsus ; metatarsus nearly half length of tibia and slightly less than half the rest of tarsi combined ; claw with one tooth (fig. 4).

Abdomen : reddish-brown ; slightly longer than thorax, width nearly equal to that of head, broader than thorax ; sculpture nearly the same as that of thorax ; lanceolate oval, with apical end tapering ; ovipositor extruding beyond ovipositor sheath ; 6 tergites distinctly visible, first one the largest, rest of tergites gradually becoming shorter.

Holotype ♀, India : Madras, parasitic on an Embiopteran, 10.iii.1957, dissected and mounted on slide No. 1/B, T. N. Ananthakrishnan collection.

Paratype : 1 ♀, preserved in alcohol, same data.

This is the first record of the genus and family from India.



Figs 1–4—*Mystrocnemus madrasensis* sp.n. : (1) antenna ; (2) fore leg ; (3) hind leg ; (4) tarsal claw.

References

Brues, C. T. and Melander, A. L., 1932, Classification of insects. A key to the known families of insects and other terrestrial Arthropods. *Bull. Mus. comp. Zool. Harv.* **73** : 521.

Kieffer, J. J., 1914, *Das Tierreich* 41. *Hymenoptera, Bethylidae.* Leipzig.

Kurian, C., 1954, Catalogue of Oriental Bethyloidea. *Agra Univ. J. Res.* (*Sci.*) **3** : 287–8.

Pruthi, H. S. and Mani, M. S., 1942, Lists of and notes on hosts and habits of Indian Bethylidae. *Mem. Indian Mus.* **13** : 423–44.

Richards, O. W., 1939, The Bethylidae subfamily Sclerogibbinae. *Proc. R. ent. Soc. Lond.* (B) **8** : 211–23.

Reid, J. A., 1941, The thorax of the wingless and short-winged Hymenoptera. *Trans. R. ent. Soc. Lond.* **91** : 412–4.

NEW OR LITTLE-KNOWN SPECIES OF EXOTIC TIPULIDAE (DIPTERA).—IX

By Charles P. Alexander

(*University of Massachusetts, Amherst, Massachusetts*)

The preceding part in this series of papers was published in 1960 (*Proc. R. ent. Soc. Lond.* (B) **29** : 160–4). The species discussed at this time are from the western Himalayas, in Kumaon, Uttar Pradesh, India, where they were collected by Dr. Fernand Schmid, to whom my sincere thanks are extended.

In this paper I am considering species of the tribe Pediciini, all belonging to the subgenus *Rhaphidolabis* Osten Sacken in the extensive genus *Dicranota* Zetterstedt. Types of the new species are preserved in my collection.

Dicranota (Rhaphidolabis) lacteipennis sp. n.

Size medium (wing about 6 mm.) ; general coloration of praescutum brownish-yellow, with 3 brownish-grey stripes, pleura yellow ; antennae apparently only 12-segmented ; halteres and legs yellow ; wings milky-white, unmarked, veins pale ; male hypopygium with the central area of posterior border of tergite depressed, provided with setae ; basistyle with 2 apical lobes, both provided with spinoid setae ; interbase bent at a right angle at near mid-length, thence extended into a strong spine ; dististyle a flattened yellow blade.

Male : length about 4·5 mm. ; wing 5·8–6 mm.

Female : length about 5 mm. ; wing 6·2 mm.

Rostrum and palpi brownish-black, mouthparts pale. Antennae short, apparently only 12-segmented ; flagellar segments oval, exceeding the verticils. Head light grey.

Pronotum obscure yellow. Mesonotal praescutum brownish-yellow, with 3 brownish-grey stripes, the sublateral pair short and ill-defined ; posterior sclerites of notum light pruinose on central part, paling to yellow laterally, pleurotergite yellow. Pleura yellow, the sternopleurite passing into brown. Halteres pale yellow. Legs with coxae and trochanters yellow ; remainder of legs obscure yellow, the outer tarsal segments somewhat darker. Wings (fig. 1) milky-white unmarked ; veins pale, scarcely differentiated from the ground. Veins beyond level of cord with abundant short macrotrichia, including a few on R_2 ; basad of cord with very sparse trichia on *Rs*, more numerous on outer ends of both anal veins. Venation : *Sc* long, Sc_1 ending some distance beyond fork of the short R_{2+3+4} ; *Rs* angulated at near mid-length ; R_2 slightly oblique, R_{1+2} very short ; *m-cu* about three-fourths its length beyond the fork of *M*.

Abdomen dark brown, hypopygium brownish-yellow. Ovipositor very long and slender, horn yellow. Male hypopygium (fig. 4) with the posterior border of tergite (*t*) sinuously truncate, the central portion depressed, with a concentration of long setae, the lateral shoulders low and obtuse ; lateral margins of ventral tergal plate terminating in slender incurved rods. Basistyle (*b*) terminating in two lobes that are densely provided with spinoid setae, the longer outer lobe emarginate on its inner apical part, inner lobe low but extensive ; interbase (*i*) a slender sclerotised rod, at near mid-length bent at a right angle into an acute spine. Dististyle (*d*) subequal in area to outer lobe of basistyle, appearing as a flattened yellow blade, dilated beyond base, thence narrowed to the obtuse tip. Phallosome (*p*) with the apophyses appearing as flattened, dusky blades that subtend the capitate aedeagus.

Holotype ♂, India : Kulara, Pauri Garhwal, 12,000 feet, 3.viii.1958 (*F. Schmid*). *Allotopotype* ♀, pinned with type. *Paratopotype* ♂, pinned with type.

Dicranota (*Rhaphidolabis*) *lacteipennis* is readily distinguished from the now numerous members of the subgenus in the region by the milky colour of the wings and by the details of structure of the male hypopygium, particularly the tergite, basistyle and interbase.

Dicranota (Rhaphidolabis) balarama sp. n.

Size relatively large (wing of male 7·5 mm.); thorax buffy-yellow, praescutum with 3 light brown stripes; antennae black throughout; legs brownish-black to black; wings tinged with light brown, stigma very pale brown; male hypopygium large; interbase distinctive, very large, appearing as a flattened yellow plate, the margin bifid into a slender rod and a pendant acute spine.

Male: length about 6·5 mm.; wing 7·5 mm.; antenna about 1 mm.

Rostrum and palpi dark brown. Antennae broken beyond the twelfth segment, black throughout; flagellar segments oval, exceeding the verticils. Head light grey.

Pronotum buffy-yellow. Mesonotal praescutum greyish-buffy, with 3 light brown stripes, the lateral pair crossing the suture on to the scutal lobes; remainder of notum buffy-yellow, mediotergite slightly more darkened. Pleura buffy. Halteres with stem obscure yellow, knob infuscated. Legs with all coxae and trochanters yellow; femora brownish-black, bases obscure yellow; tibiae dark brown; tarsi black. Wings (fig. 2) tinged with light brown, extreme base more yellowed; stigma oval, very pale brown, proximal parts of costal region vaguely more darkened than the remainder of ground; veins brown, yellowed at wing base. Veins of about the outer three-fourths of wing with numerous relatively long macrotrichia. Venation: *Sc* long, Sc_1 ending some distance beyond the fork of R_{2+3+4}, the latter long, about 3 times the basal section of R_5; R_2 transverse, about twice R_{1+2}; *m-cu* more than one-half its length beyond the fork of *M*.

Abdomen, including hypopygium, brown. Male hypopygium (fig. 5) entirely distinctive, particularly as regards the interbase. Ninth tergite (*t*) transverse, the central area depressed, the margin with 2 small tubercles (lateral parts of tergite more or less damaged and the presence of armature cannot be determined). Basistyle (*b*) large, on proximal half swollen into a low darkened lobe that bears long setae; mesal apical end set with abundant spinoid setae, with a further cylindrical lobe that bears a few very long setae, including a powerful fasciculate bristle; interbase (*i*) very large, its area on a microscope slide being nearly one-half the remainder of the basistyle, appearing as a flattened yellow plate shaped about as shown, the margin bifid into a slender outer arm and a lower pendant spine; apical margin of interbase with a dense linear group of reddish setae. Dististyle (*d*) single, unusually small, its area about one-fourth that of the interbase, the lower margin dilated near base. Phallosome (*p*) with the aedeagus cylindrical, not capitate, the subtending apophyses dark coloured.

Holotype ♂, India: Binaik Cahatti, Pauri Garhwal, 7000–7500 feet, 16.vi.1958 (*F. Schmid*).

The most similar species in the region is *Dicranota* (*Rhaphidolabis*) *shushna* sp. n., which, while similar in general appearance, differs strikingly in the structure of the male hypopygium, especially the tergite, interbase and dististyles.

Dicranota (Rhaphidolabis) shushna sp. n.

Size relatively large (wing of male 7 mm. or more); thorax buffy, praescutum with 3 barely indicated darker brown stripes; legs light brown, tarsi more blackened; wings weakly tinted, stigma scarcely darker than the ground; male hypopygium with apical margin of tergite decurved; interbase a relatively narrow rod bearing a lateral spine; two dististyles; phallosome with the apophyses broadly expanded.

Male: length about 6·2–6·5 mm.; wing 7–7·5 mm.; antenna about 1–1·1 mm.

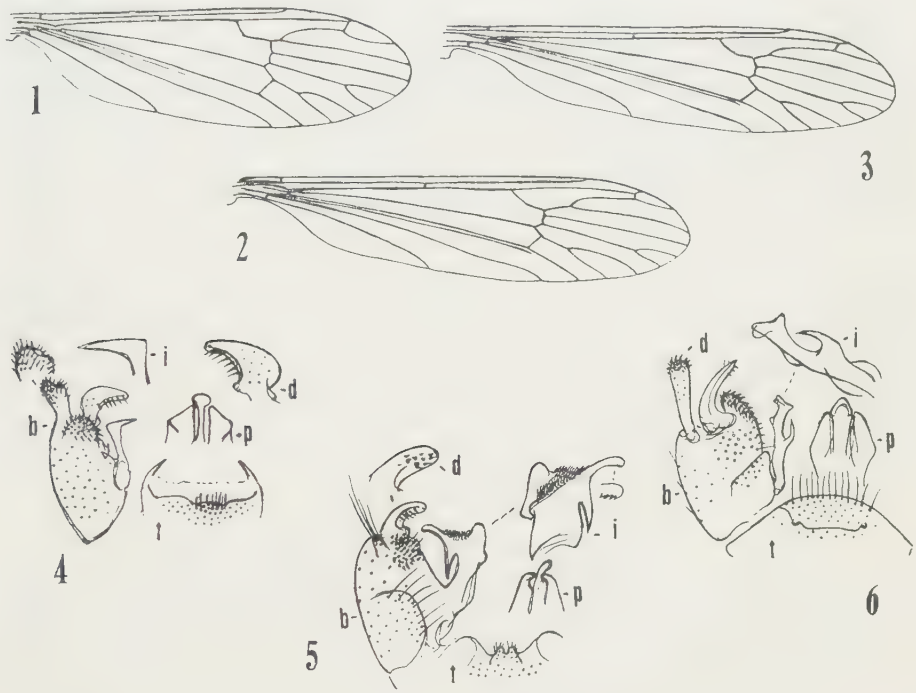
Female: length about 7·5 mm.; wing 8·5 mm.

Rostrum light brown; palpi small, brown; mouthparts enlarged, yellow. Antennae 15-segmented; scape and pedicel light brown, flagellum black; flagellar segments oval, exceeding their verticils in length. Head clear light grey.

Pronotum light buffy. Mesonotal praescutum buffy, with barely indicated darker brown stripes, scutal lobes similarly patterned; posterior sclerites of notum and the pleura buffy-yellow. Halteres with stem pale, especially at base, knob infuscated. Legs with coxae and trochanters yellow; remainder of legs light brown, tips of tibiae and tarsi excepting the proximal ends of basitarsi more blackened. Wings (fig. 3) weakly tinged, the extreme base more yellowed; stigma scarcely darker than the ground; veins brown. Macrotrichia on veins of about the outer three-fourths of wing. Venation: *Sc* long, Sc_1 ending beyond fork of R_{2+3+4}, the latter relatively short, scarcely exceeding twice the basal section of R_5; *Rs* weakly angulated at near mid-length.

Abdominal tergites medium brown, basal sternites more brownish-yellow; hypopygium darkened. Male hypopygium (fig. 6) relatively large; tergite (*t*) massive, its apex decurved so

that in slide mounts the posterior border is hidden, the actual margin gently notched, with small lateral projections ; surface of outer end of tergite with abundant, unusually long setae. Basistyle (*b*) with a subconical darkened lobe on mesal face of proximal end ; apical lobe large, with abundant retrorse black spinoid setae on mesal face ; interbase (*i*) distinctive, shaped about as shown, appearing as a relatively narrow rod, at near mid-length with a large spine ; outer half of style slender, expanded at apex. Two dististyles (*d*), the outer clavate, with spinoid setae on outer third ; inner style gently curved, expanded at base. Phallosome (*p*) with the head of the aedeagus long-oval, the subtending apophyses appearing as broadly expanded plates, their surface microscopically roughened.



FIGS. 1–6.—(1–3) Venation of : (1) *Dicranota* (*Rhaphidolabis*) *lacteipennis* sp. n. ; (2) *Dicranota* (*Rhaphidolabis*) *balarama* sp. n. ; (3) *Dicranota* (*Rhaphidolabis*) *shushna* sp. n. (4–6) Male hypopygium of : (4) *Dicranota* (*Rhaphidolabis*) *lacteipennis* sp. n. ; (5) *Dicranota* (*Rhaphidolabis*) *balarama* sp. n. ; (6) *Dicranota* (*Rhaphidolabis*) *shushna* sp. n. (*b*, basistyle ; *d*, dististyle ; *i*, interbase ; *p*, phallosome ; *t*, tergite.)

Holotype ♂, INDIA : Timarsen, Pauri Garhwal, 11,172 feet, 12.vii.1958 (*F. Schmid*). *Allotopotype* ♀, pinned with type. *Paratopotypes*, 2 ♂.

The most similar species in the region is *Dicranota* (*Rhaphidolabis*) *balarama* sp. n. which, while superficially rather similar, is entirely distinct in the structure of the male hypopygium, involving all parts.

Dicranota (Rhaphidolabis) indra sp. n.

Size relatively large (wing of male about 7 mm.) ; general coloration of mesonotum grey, with 3 poorly indicated brown stripes, posterior sclerites of notum and the pleura more yellowed ; wings subhyaline ; strongly iridescent ; *Sc* long ; male hypopygium with the posterior border of tergite with two low submedian lobes ; interbase a broad yellow blade, on outer margin with a small acute spine ; dististyle single, gently curved, apex obtuse.

Male : length about 6 mm. ; wing 6·8–7 mm. ; antenna about 0·9–1 mm.

Female : length about 7 mm. ; wing 7·5–8 mm.

Rostrum grey ; palpi black. Antennae short, 14- or 15-segmented ; scape brown, remainder of organ black ; flagellar segments oval, slightly exceeding the longest verticils. Head light grey, posterior vertex with a linear darkened median vitta.

Pronotum brownish-grey. Mesonotal praescutum grey, with 3 poorly indicated brown stripes, scutal lobes similarly darkened ; posterior sclerites of notum much paler, more yellowed. Pleura brownish-yellow. Halteres with stem pale, knob infuscated. Legs with coxae and trochanters testaceous ; remainder of legs brown, outwardly passing into dark brown or brownish-black. Wings (fig. 7) subhyaline, with iridescent tints, stigma very pale brown ; veins dark brown. Numerous macrotrichia on veins of about the outer three-fourths of wing. Venation : *Sc* long, Sc_1 ending some distance beyond fork of R_{2+3+4} ; R_2 slightly oblique, in cases more transverse, longer than R_{1+2} ; *Rs* short, strongly arcuated to weakly angulated.

Abdomen brownish-grey, pleural membrane paler ; hypopygium darkened. Male hypopygium (fig. 10) with the tergite (*t*) transverse, the posterior border slightly produced, the central part with two low rounded lobes separated by a slightly wider and more shallow emargination : lateral arms indicated by ill-delimited projections ; in a paratopotype, dorsal surface immediately behind each submedian lobe with a smaller darkened projection. Basistyle (*b*) stout, the outer apical part produced into a short-oval lobe set with spinoid setae, the inner apical part produced into a much more extensive but lower lobe with abundant blackened spinoid setae ; mesal face of style both at base and apex with groups of long pale setae ; interbase (*i*) a broad flattened yellow blade, apex obtuse, on outer margin produced into a small acute spine. Dististyle (*d*) single, gently curved, apex obtuse. Phallosome (*p*) with aedeagus elongate, not capitate, the broad apophyses darkened.

Holotype ♂, India : Kulara, Pauri Garhwal, 12,000 feet, 4.viii.1958 (*F. Schmid*). *Allotype* ♀, India : Tapoban, Pauri Garhwall, 7300 feet, 2.viii.1958 (*F. Schmid*). *Paratopotypes*, 3 ♂, with the type. *Paratypes*, 3 ♂ 1 ♀, Dakwani, Pauri Garhwal, 9300–11,000 feet, 5.viii.1958 ; ♂♀, Ramni, Pauri Garhwal, 8200 feet, 15.viii.1958 ; ♂♀, Kanol, Pauri Garhwal, 8530 feet, 19.viii.1958 (all *F. Schmid*).

Dicranota (*Rhaphidolabis*) *indra* is quite distinct from the now numerous species of the subgenus in the Himalayas, particularly in the structure of the male hypopygium, *e.g.* the tergite, basistyle, interbase and phallosome.

Dicranota (Rhaphidolabis) vajra sp. n.

Size medium (wing of male 6 mm. or more) ; general coloration light grey, the praescutum with a conspicuous brown central stripe, the lateral stripes much less evident ; antennae short, 12-segmented, black throughout ; legs brown ; wings faintly tinged with milky, stigma scarcely evident, veins very pale brown ; male hypopygium with the posterior border of tergite convexly rounded medially ; interbase a pale simple crook, the lower margin of the head crenulate.

Male : length about 5·3–5·5 mm. ; wing 6–6·5 mm. ; antenna about 0·8 mm.

Rostrum grey, palpi black, remaining mouthparts yellow. Antennae black throughout, 12-segmented ; basal flagellar segments long-oval, becoming smaller outwardly, the terminal segment shortest. Head light grey.

Pronotum and mesonotum light grey, praescutum with a conspicuous brown central stripe, the lateral pair narrow and much less evident ; scutal lobes darkened. Pleura grey, the pteropleurite and metapleura paler ; dorsopleural membrane dusky. Halteres with stem pale, knob infuscated. Legs with coxae brownish-grey, posterior pair paler basally ; trochanters testaceous yellow ; remainder of legs brown. Wings (fig. 8) with a faint milky tinge, stigma not or scarcely evident ; veins very pale brown. Macrotrichia of veins beyond cord short and relatively sparse, basad of this few and scattered on *Rs* and on outer ends of *M*, *Cu* and anals. Venation : *Sc* long, Sc_1 ending some distance beyond fork of R_{2+3+4}, the latter short, subequal to or a little longer than the basal section of R_5 ; vein R_2 oblique, longer than R_{1+2}.

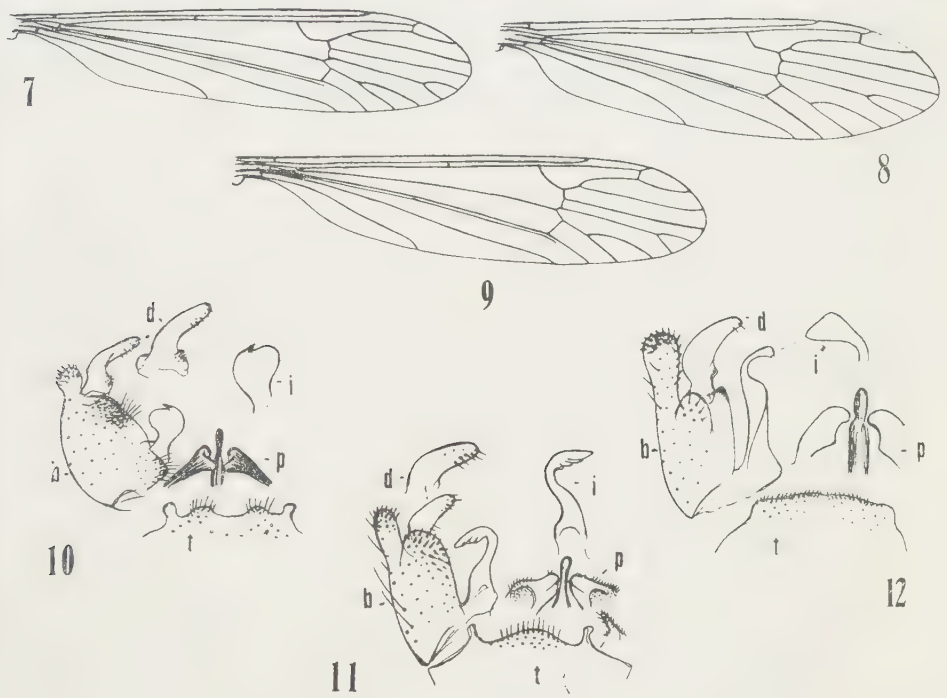
Abdomen, including hypopygium, greyish-brown, subterminal segments slightly darker brown, forming an inconspicuous ring. Male hypopygium (fig. 11) with the posterior border of tergite (*t*) broadly convexly rounded, with abundant long pale setae ; lateral arms small and pale, slightly expanded at tip ; lower tergal arms relatively small, densely setiverous. Basistyle (*b*) with 2 apical lobes, the clavate outer one with spinoid setae on outer half, the low inner lobe with setae more sparse ; interbase (*i*) a pale simple rod, strongly curved beyond mid-length into a crook, the lower surface of the outer head weakly crenulate or shallowly lobed. Dististyle (*d*) a simple yellow plate, the lower margin at apex with a few setae. Phallosome (*p*) with the apophyses broad, densely setuliferous on lateral part ; aedeagus darkened, apex oval, not capitate.

Holotype ♂, India: Gangrea, Pauri Garhwal, 7500–10,000 feet, 14.vi.1958 (*F. Schmid*). *Paratopotypes*, 2 ♂, pinned with type; 2 ♂, 13–15.vi.1958 (*F. Schmid*).

The closest ally of the present fly in the region is *Dicranota* (*Rhaphidolabis*) *vritra* sp. n., which has the structure of the interbase of the hypopygium somewhat the same, but all other parts quite distinct.

Dicranota (Rhaphidolabis) vritra sp. n.

Size relatively large (wing of male 7 mm.); general coloration of thorax grey, the praescutum with 3 relatively inconspicuous brown stripes; antennae 15-segmented; legs dark brown; wings subhyaline, stigma pale brown, relatively distinct, veins brown; macrotrichia on outer two-



Figs. 7–12.—(7–9) Venation of: (7) *Dicranota* (*Rhaphidolabis*) *indra* sp. n.; (8) *Dicranota* (*Rhaphidolabis*) *vajra* sp. n.; (9) *Dicranota* (*Rhaphidolabis*) *vritra* sp. n. (10–12) Male hypopygium of: (10) *Dicranota* (*Rhaphidolabis*) *indra* sp. n.; (11) *Dicranota* (*Rhaphidolabis*) *vajra* sp. n.; (12) *Dicranota* (*Rhaphidolabis*) *vritra* sp. n. (*b*, basistyle; *d*, dististyle; *i*, interbase; *p*, phallosome; *t*, tergite.)

thirds of veins *M*, 1*st A* and 2*nd A*; male hypopygium with the posterior border of tergite almost truncate, fringed with numerous short setae, lateral tergal arms very low; interbase a glabrous blade, the outer third narrowed and curved into a crook.

Male: length about 6·5 mm.; wing 7 mm.; antenna about 1 mm.

Rostrum and palpi brown. Antennae black, 15-segmented; flagellar segments oval, exceeding the verticils in length. Head grey.

Pronotum brownish-grey. Mesonotum grey, the praescutum with three relatively inconspicuous brown stripes, the lateral pair less evident; scutal lobes weakly infuscated. Pleura brownish-grey. Halteres with stem pale, knob weakly infuscated. Legs with coxae brownish-grey; trochanters yellow; remainder of legs dark brown, femoral bases narrowly obscure yellow. Wings (fig. 9) subhyaline, stigma pale brown, relatively distinct; veins brown. Macrotrichia of veins short but numerous, involving about the outer two-thirds of *M* and the anals. Venation: *Sc* long, Sc_1 ending some distance beyond fork of R_{2+3+4}, the latter about one-half longer than the basal section of R_5; *m-cu* from about two-fifths to one-half its length beyond the fork of *M*.

Abdomen brownish-grey, the lateral borders narrowly more yellowed. Male hypopygium (fig. 12) with the tergite (*t*) large, its posterior border produced, the margin subtruncate to almost straight, fringed with numerous short setae ; lateral arms slightly produced into low lobes. Basistyle (*b*) with the outer apical lobe stout, narrowed basally, expanded into a flattened club, the apex and inner margin with short dark spinoid setae ; inner apical lobe low, with sparse pale spinoid setae ; interbase (*i*) distinctive, appearing as a relatively slender glabrous blade, the outer third narrowed and curved into a crook, the apex a little expanded ; no crenulations, as in *vajra*. Dististyle (*d*) a flattened blade, broadest at near mid-length, narrowed to the obtuse tip ; vestiture very sparse and inconspicuous. Phallosome (*p*) with the aedeagus elongate, not capitate, apophyses appearing as moderately broad blades, their tips obtuse.

Holotype ♂, INDIA : Gangrea, Pauri Garhwal, 7500–10,000 feet, 14.vi.1958 (*F. Schmid*).

Dicranota (*Rhaphidolabis*) *vritra* is most similar to *D.* (*R.*) *vajra* sp. n., among the known species of the region, differing in the structure of the antennae and male hypopygium, and in the details of coloration of the body and wings.

INDEX

New names are marked with an asterisk

abyssinica, Stenalia, 40
Acridinae, 153, 156
Acridoidea, 155
Acrostegastes, 156
Acteana, 156
adleri, Sergentomyia (Sintonius), 34, 35
affinis vorax, Sergentomyia (Sintonius), 34, 35
africana, Sergentomyia (Parrotomyia), 32, 35, 36
africana magna, Sergentomyia (Parrotomyia), 32, 35
var. africanus, Pseudocaecilius elutus, 141
albicans, Archiborborus (Procopromyza), 57, 62
Alphitophagus bifasciatus, 112
americana, Schistocerca, 155
Amphicremna, 156
*Anisops spinosus, 129
*anomalus, Pseudocaecilius, 146
antennata, Sergentomyia (Sergentomyia), 29, 35
*Apanteles lemariei, 50
*— tedellae, 50
apicalis, Macrostomus, 53
Aplatacris, 156
Archiborborus, 57
— (Archiborborus) hirtipes, 57, 59
*— — maximus, 57, 59
— (Huapia) microphthalma, 57
— (Procopromyza) albicans, 57, 62
*— — chaetosus, 58, 60
— — chilensis, 58
— — edwardsi, 58
— — hirtus, 58, 61
— — maculipennis, 58, 61
— — orbitalis, 58
— — — *var.* latifrons, 58
— — quadrinotus, 58, 61
— — setosus, 58
— — simplicimanus, 58, 61
— — submaculatus, 59, 62
arcucincta, Macrostomus, 53
argyrotarsis, Macrostomus, 53
Asterolecanium minus, 4–14
— quercicola, 4–14
— variolosum, 4–14
auricularia, Forficula, 23–4

*balarama, Dicranota (Rhaphidolabis), 168
Barnesina, 1*n*
Batrachacris viridis, 157
bedfordi, Sergentomyia (Sergentomyia), 30, 35, 36
bifasciatus, Alphitophagus, 112
Bostrychinae, 117, 118
Brachystola, 156
*Brachystomella surendrai, 124
brevicornis, Pseudocaecilius, 149
*brondeeli, Lesteva, 73
bruneri, Colpolopha, 155
buxtoni, Sergentomyia (Sergentomyia), 30

*calceata, Frutillaria, 67
Calycina, 16, 17
*cardinis, Parapsyllus, 44
cargilli, Pseudomethoca, 103
carinata, Deinacrida, 87
Catantopinae, 153, 155, 156
*chaetosus, Archiborborus (Procopromyza), 58, 60
*chepuensis, Frutillaria, 66
Chilacridinae, 153, 156
chilensis, Archiborborus (Procopromyza), 58
citricola, Pseudocaecilius, 142
clydei, Sergentomyia (Sintonius), 34, 35, 36
clydei latiterga, Sergentomyia (Sintonius), 34
coeruleocephala, Stenalia, 42
Colpolopha bruneri, 155
— obsoleta, 155
connectens, Deinacrida, 87–88
*cretica, Lesteva longelytrata, 76
Cyrtacanthacridinae, 156

darwini, Leptocera (Limosina), 63
Dasymutilla militaris, 104
— — nigriceps, 104–5
decipiens, Sergentomyia (Rondanomyia), 33
Deinacrida, 86
— carinata, 86
— connectens, 87
— sonitospina, 86, 87, 88
Dericorythinae, 156
*Dicranota (Rhaphidolabis) balarama, 168
*— — indra, 169
*— — lacteipennis, 167
*— — shushna, 168
*— — vajra, 170
*— — vritra, 171
Dinoderinae, 117
Diponthini, 157
Diponthus, 153
— paraguayensis, 153
dolichoptera, Macrostomus, 53
dollmani, Stenalia, 41
*Dollmania, 15
Dracotettix, 156
dubosqui, Phlebotomus (Phlebotomus), 29, 34, 35, 36
dureni, Sergentomyia (Rondanomyia), 33, 35
*dycei, Myzus, 69
Dysidinae, 117

*edenensis, Frutillaria, 67
edwardsi, Archiborborus (Procopromyza), 58
Egnatiinae, 153, 155
elutus, Pseudocaecilius, 141
elutus *var.* africanus, Pseudocaecilius, 141
embiidarum, Mystrocnemis, 164
enciari, Notiopsylla, 49
Endecatominae, 116, 117
Endecatomus, 118
— reticulatus, 113
— rugosus, 113, 116
Epilachna indica, 133
*— karenensis, 137
— ocellata, 137
— 28-punctata, 133
Eremogryllinae, 153
erythrothorax, Mystrocnemis, 164
Eucrada, 118

Euderia, 118
— squamosa, 113, 114
Euderinae, 117, 118
Eumenotes, 91

fasciatus, Nosopsyllus, 49
fasciventris, Macrostomus, 54
ferrugineus, Macrostomus, 55
Folengus, 91
Forficula auricularia, 23–4
Forficulina, 19, 21–22, 23
*Frutillaria, 63
*— calceata, 67
*— chepuensis, 63
*— edenensis, 67
*— kuscheli, 66
*— stenoptera, 67
fulvithorax, Macrostomus, 54

grallatrix, Macrostomus, 53
gregaria, Schistocerca, 159
guineensis, Tabanus, 79

*Hadrophanurus karnalensis, 161
— pennsylvanicus, 163
heardi, Parapsyllus magellanicus, 43, 44, 45
Hedobia, 118
Hemiandrus lanceolatus, 85
Hemimerus, 19–25
Henria psalliotae, 1
*heterohirsuta, Tetraneura, 83
Higehananomia, 16
*hightoni, Simulium, 110
*hirsutus, Pseudocaecilius, 148
hirtipes, Archiborborus (Archiborborus), 57, 59
hirtus, Archiborborus (Procopromyza), 58, 61

imperfectus, Meligethes, 132
indica, Epilachna, 133
*indra, Dicranota (Rhaphidolabis), 169
inermis, Sergentomyia (Grassomyia), 33
ingrami, Sergentomyia (Rondanomyia), 33
innotatus, Pseudocaecilius, 149
*iranicus, Phlebotomus (Sergentomyia), 121

johnsoni, Leptocera (Thoracochaeta), 63

Kabulia, 156, 157
*karenensis, Epilachna, 137
*karnalensis, Hadrophanurus, 161
kerguelensis, Notiopsylla, 49
*kuscheli, Frutillaria, 66

*lacteipennis, Dicranota (Rhaphidolabis), 167
lanceolatus, Hemiandrus, 85
var. latifrons, Archiborborus (Procopromyza) orbitalis, 58
*latipes, Lesteva, 74
latiterga, Sergentomyia (Sintonius) clydei, 34
*lemariei, Apanteles, 50
Leptocera (Leptocera) neocurvinervis, 63
— (Limosina) darwini, 63
— (Thoracochaeta) johnsoni, 63
lesleyae, Phelebotomus (Phlebotomus), 123
*Lesteva brondeeli, 73
*— latipes, 74
*— longelytrata cretica, 76
*— nitidicollis, 72
*— szekessyi, 74
limbipennis, Macrostomus, 54
Locusta, 21
*longelytrata cretica, Lesteva, 76
longicornis, Parapsyllus, 45
Lyctinae, 117
Lyrotyloides, 157
Lyrotylus, 157

macerrima, Macrostomus, 54
Machaeridia, 156
macrocephala, Stenalia, 38
Macrostomus, 53
— apicalis, 53
— arcucincta, 53
— argyrotarsis, 53
— dolichoptera, 53
— fasciventris, 54
— ferrugineus, 55
— fulvithorax, 54
— grallatrix, 53
— limbipennis, 54
— macerrima, 54
— nigriventris, 53
— perpulchra, 54
— pictipennis, 54, 55
* maculifrons, Pseudocaecilius, 142
maculipennis, Archiborborus (Procopromyza), 58, 61
*madrasensis, Mystrocnemis, 164
magellanicus heardi, Parapsyllus, 43, 44, 45
magna, Sergentomyia (Parrotomyia) africana, 32, 35
*maximus, Archiborborus (Archiborborus), 57, 59
Meligethes imperfectus, 132
— perfectus, 132
*— suppar, 131
microphthalma, Archiborborus (Huapia), 57
militaris, Dasymutilla, 104
militaris nigriceps, Dasymutilla, 104
minus, Asterolecanium, 4–14
Munatia, 153, 156
*murphyi, Sergentomyia (Sergentomyia), 32
Mystrocnemis, 164
— embiidarum, 164
— erythrothorax, 164
*— madrasensis, 164
*Myzus dycei, 69

neavei, Simulium, 108
neocurvinervis, Leptocera (Leptocera), 63
Neogaea, 158
nigriceps, Dasymutilla militaris, 104–105
nigriventris, Macrostomus, 53
*nitidicollis, Lesteva, 72
Nosopsyllus fasciatus, 49
Notiopsylla enciari, 49
— kerguelensis, 49
nyasalandicum, Simulium, 108, 109

obsoleta, Colpolopha, 155
ocellata, Epilachna, 137
Ommexechidae, 155
orbitalis, Archiborborus (Procopromyza), 58
orbitalis *var.* latifrons, Archiborborus (Procopromyza), 58
ovazzae, Simulium, 110

Pamphagidae, 155
*Parafolengus, 90
*— pipturuscus, 93
paraguayensis, Diponthus, 153
Paraparga, 156
*Parapsyllus cardinis, 44
— longicornis, 45
— magellanicus heardi, 43, 44, 45
— taylori, 45
Parga, 156
Pelecinotus, 157

pennsylvanicus, Hadrophanurus, 163
perfectus, Meligethes, 132
Periplaneta, 21
perpulchra, Macrostomus, 54
Phlebotomus (Anaphlebotomus) rodhaini, 29, 35
— (Phlebotomus) dubosqui, 29, 34, 35, 36
— — lesleyae, 123
*— (Sergentomyia) iranicus, 121
Phrynotettix, 156
pictipennis, Macrostomus, 54, 55
*pipturuscus, Parafolengus, 93
Polyphaginae, 158
Prionacris, 153, 157
psalliotae, Henria, 1
*Pseudocaecilius anomalus, 146
— brevicornis, 149
— citricola, 142
— elutus, 141
— — *var.* africanus, 141
*— hirsutus, 148
— innotatus, 149
*— maculifrons, 142
— solocipennis, 149
— tenellus, 149
— testaceus, 149
Pseudomethoca cargilli, 103
Psoinae, 117
28-punctata, Epilachna, 133
*Pyrgomorphella turcica, 27
Pyrgomorphidae, 155

quadrinotus, Archiborborus (Procopromyza), 58, 61
*queenslandana, Rhinacloa, 77
quercicola, Asterolecanium, 4–14

reticulatus, Endecatomus, 113
*Rhinacloa queenslandana, 77
Robecchia, 157
rodhaini, Phlebotomus (Anaphlebotomus), 29, 35
Romaleinae, 153–60
rugosus, Endecatomus, 113, 116

Schistocerca, 159
— americana, 155
— gregaria, 159
schoutedeni, Sergentomyia (Sergentomyia), 30
schwetzi, Sergentomyia (Sergentomyia), 31, 35, 36
Sclerogibbidae, 164
*scraptiiformis, Dollmania, 17
Sergentomyia (Grassomyia) inermis, 33
— — squamipleuris, 32
— (Parrotomyia) africana, 32, 35, 36
— — — magna, 32, 35
— (Rondanomyia) decipiens, 33
— — dureni, 33, 35
— — ingrami, 33
— (Sergentomyia) antennata, 29, 35
— — bedfordi, 30, 35, 36
— — buxtoni, 30
— — dubia, 30, 35
*— — murphyi, 32
— — schoutedeni, 30
Sergentomyia (Sergentomyia) schwetzi, 31, 35, 36
— — simillima, 31, 35
— (Sintonius) adleri, 34, 35
— — affinis vorax, 34, 35
— — clydei, 34, 35, 36
— — — latiterga, 34
setosus, Archiborborus (Procopromyza), 58
*shushna, Dicranota (Rhaphidolabis), 168
simillima, Sergentomyia (Sergentomyia), 31, 35
simplicimanus, Archiborborus (Procopromyza), 58, 61
Simulium *sp.*, 110
*— hightoni, 110
— neavei, 108
— nyasalandicum, 108, 109
— ovazzae, 110
— woodi, 110
solocipennis, Pseudocaecilius, 149
sonitospina, Deinacrida, 86, 87, 88
Spaniacris, 155
*spinosus, Anisops, 129
squamipleuris, Sergentomyia (Grassomyia), 32
squamosa, Euderia, 113, 114
Stenalia abyssinica, 40
— coeruleocephala, 42
— dollmani, 41
— macrocephala, 38
— turneri, 42
*stenoptera, Frutillaria, 67
Strobiloestrus, 95
*— vanzyli, 99
subangustus, Tabanus, 80
submaculatus, Archiborborus (Procopromyza), 59, 62
sugens, Tabanus, 80
*suppar, Meligethes, 129
*surendrai, Brachystomella, 124
*szekessyi, Lesteva, 74

Tabanus guineensis, 79
— subangustus, 80
— sugens, 80
taylori, Parapsyllus, 45
*tedellae, Apanteles, 50
tenellus, Pseudocaecilius, 149
Teratodes, 157
testaceus, Pseudocaecilius, 149
*Tetraneura heterohirsuta, 83
Thalma, 91
Timulla (Timulla) trimaculosa, 105
trimaculosa, Timulla (Timulla), 105
Truxalinae, 153
*turcica, Pyrgomorphella, 27
turneri, Stenalia, 42

*vajra, Dicranota (Rhaphidolabis), 170
*vanzyli, Strobiloestrus, 99
variolosum, Asterolecanium, 4–14
viridis, Batrachacris, 157
vorax, Sergentomyia (Sintonius) affinis, 34, 35
*vritra, Dicranota (Rhaphidolabis), 171

woodi, Simulium, 110

Zoniopodini, 154

PUBLICATIONS

The principal Publications of the Royal Entomological Society are *Transactions* and *Proceedings*.

The **Transactions** form an annual volume, each paper in the volume being issued as a separate part. The parts are issued irregularly throughout the year.

The **Proceedings** are issued in three series :

Series A. **General Entomology**
Series B. **Taxonomy**
Series C. **Journal of Meetings**

Series A and B are issued in twelve parts, forming an annual volume of approximately 240 pages each.

The following information is supplied for the guidance of authors wishing to submit papers for publication in any of the Society's journals.

TRANSACTIONS

Papers offered for publication in the *Transactions* are considered by the Publication Committee of the Society which meets usually in the months of May and November. In order that papers may be considered at these meetings it is necessary for the manuscript and drawings for illustrations to be in the hands of the Registrar as early as possible. Papers received *after* 1st April and 1st October cannot be considered at the meeting immediately following.

The Society is prepared to undertake the provision of a reasonable number of figures, in line or half-tone. Colour work is accepted only by special arrangement.

Papers of less than eight printed pages (approximately 5,000 words) will not normally be accepted for the *Transactions* and papers by authors who are not Fellows of the Society must be communicated by a Fellow.

PROCEEDINGS SERIES A AND SERIES B

Papers submitted for publication in either *Series A* or *Series B* of the *Proceedings* are considered by the Editor and may be submitted at any time. Papers by authors who are not Fellows of the Society may be accepted if they are communicated by a Fellow.

Line blocks will be provided by the Society. Half-tone and colour work are accepted only by special arrangement and the author may be required to pay for the blocks.

PROCEEDINGS SERIES C

Series C is issued before every General Meeting. It contains abstracts of communications to be made, together with the titles of papers accepted for publication in the *Transactions*.

The annual subscription to *Series A, General Entomology*, is £2 8*s*. 0*d*. ; *Series B, Taxonomy*, £2 8*s*. 0*d*. ; and *Series C, Journal of Meetings*, £1 0*s*. 0*d*.

As from January, 1936, the journal *Stylops* is continued as *Proceedings Series B Taxonomy*. Copies of volumes 1–4 are available at £1 16*s*. 0*d*. each, post free.

GENERAL

The original drawings for all figures must be supplied by authors and must be drawn to a scale which will permit of their reduction, singly or after grouping, to an area of dimensions not exceeding 7 by 5 in.

A uniform method is adopted for the citation of bibliographical references in the Society's publications as follows :

SMITH, A., 1935, New species of Coccidae. *Proc. R. ent. Soc. Lond.* (B) **6** : 301–6, pl. 1.

—— 1936, New species of Coccidae. *Trans. R. ent. Soc. Lond.* **84** : 901–36.

Titles of periodicals cited are to be abbreviated in the manner indicated in the *World List of Scientific Periodicals*, 3*rd edition*, 1952.

Authors are entitled to receive 25 copies of their papers free of charge and may purchase additional copies provided that request be made before publication.

Papers offered for publication should be sent to the Registrar, Royal Entomologica Society of London, at 41, *Queen's Gate, London, S.W.*7, and must be typewritten on one side of the paper only, with double spacing. **All papers in the Transactions must be provided with a summary.**

All the Society's publications are copyright.

MEETINGS

TO BE HELD IN THE SOCIETY'S ROOMS
41, Queen's Gate, S.W.7

1962

Wednesday, January 17
,, February 7
,, March 7

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

The Fellowship and Fees

Fellows pay an Admission Fee of £2 2*s*. The Annual Contribution, £3 3*s*., is due on the first day of January in each year, and is payable in advance. Fellows under the age of 25 years on the date of election are exempt from the payment of the Entrance Fee.

Fees should be paid to the Registrar, at 41, Queen's Gate, S.W.7.

Fellows desiring to pay their Annual Contribution through their bankers may obtain an official form of bankers' order by applying to the Registrar.

Fellows whose Contributions for the current year have been paid are entitled to receive the *Transactions* and *Proceedings* of the Society free of charge. Further copies may be purchased at reduced prices by applying to the Registrar.

Forms of application for Fellowship, copies of the Bye-Laws and the List of Fellows may be obtained form the Registrar.

Meetings and Exhibitions

Fellows and others wishing to make a communication to a General Meeting of the Society are requested to send in their names, the title of their exhibit, and a short abstract of their remarks, to the Hon. Secretary fourteen days before the meeting at which it is proposed to make the communication. Should it be desirable to publish a fuller account of the communication the manuscript may be submitted for publication in *Proceedings Series A* or *Series B*.

Fellows resident abroad, or otherwise unable to attend meetings, are reminded that notes or observations sent to the Hon. Secretary may be communicated to a General Meeting on their behalf.

PRINTED FOR THE SOCIETY BY ADLARD AND SON, LTD., BARTHOLOMEW PRESS, DORKING.